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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON.

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EDITORIAL NOTES.

Last Week in Amsterdam.

ON Wednesday and Thursday last representatives of the Institution of Gas Engineers, and of the cognate Associations of France, Germany, and Belgium, were the guests of the Association of Dutch Gas Engineers, by whom they were entertained right royally at Amsterdam. The Corporation of Amsterdam celebrated the opening of an International Gas Exhibition which it has promoted, as well as the approaching completion of its new gas-works to the south of the city, by inviting the members of the Association of Dutch Gas Engineers to visit both the exhibition and the new works, and the foreign guests participated in these visits, and in social functions which had been arranged for their delectation, through the generous hospitality of the Corporation and the Association. The proceedings are all chronicled on other pages of this issue of the "JOURNAL," but it may here be said that the meeting in Amsterdam last week has cemented yet more strongly the bonds of friendship and good-will which have long attached the gas engineers of Holland to their brethren in this country.

In technical matters, the guests found many things to see and study from which they could learn much of great value to themselves professionally. The gas exhibition was rightly termed "international," for while Dutch and German exhibitors predominated, English, American, Austrian, Belgian, and French manufactures were well in evidence. We could perhaps have wished that there had been some other prominent British firms directly exhibiting in addition to Messrs. George Bray and Co. and Messrs. Samuel Cutler and Sons; but there was a good variety of British manufactures on the stands of the Dutch firms who are the agents for them in Holland. Thus many well-known English gas-fires were to be seen, though the Continental reflector type of gas-stove appeared to be in the ascendant. We believe the British gas-fire makers have lost the hold which they should have on the Dutch market through arbitrariness in the past; and it will need all their present assiduity to recover it. It is not a market which tariffs have closed to them, for an *ad valorem* import duty of about 5 per cent., exacted purely for revenue purposes on nearly all imports, is all that they, in common with German and other competitors, have to face. It should, however, be pointed out that the Dutch manufacturers are now producing gas-fires, fittings, and appliances of such good and artistic design that Herr Lempelius, who represented Germany on the occasion, compared them with the products of German factories much to the disadvantage of the latter. Putting aside the question of competition, the Dutch makers of stoves and fittings can be unreservedly congratulated on the high merits of their exhibits. That the exhibition is well worth a visit may perhaps best be realized from the statement, for which Herr Lempelius was also responsible, that it is the finest gas exhibition which has been held on the Continent.

The rapid growth of gas consumption in Amsterdam in recent years has impelled the Corporation to erect a new gas-works on a site where ample area is available for future extensions. The site has a long frontage to the River Amstel, is well on the outskirts and to the south of the city, and has railway communication. The ground-level, which is several feet below the surface of the river, has been raised some 15 feet by sand brought from the dunes on the coast. This preliminary preparation of the site, and the driving of piles 40 to 60 feet in length, on which the foundations of all structures must be carried on such a subsoil, has been going on for some years past, and now the buildings and the equipment of the works are nearing completion. The carbonizing plant, which is wholly Dessau vertical retorts in beds of eighteen, will have a productive capacity of over 6 million cubic feet of gas per diem. A plan and some particulars of the equipment of the new works are given on another page of to-day's "JOURNAL," but it may be observed that the design throughout reflects the greatest credit on Heer J. van Rossum du Chattel, the Chief Engineer of the Amsterdam undertaking, and on Heer Chr. K. Visser, the Assistant Engineer, who is resident on the new works for the direct supervision of their construction.

As to the social events of last week's meeting, those who have experienced at any time the hospitality of Dutch engineers will understand that from the "raout" or reception on Wednesday evening, through the steamboat excursion on the Amstel on Thursday afternoon, to the banquet in the evening, the visit was made one of uninterrupted pleasure to the fortunate guests of the Corporation of Amsterdam and the Association of Dutch Gas Engineers.

Depreciation Allowance for Income-Tax.

CONCERNING this much-vexed question, the negotiations of the Committee representing Statutory Gas Companies with the Inland Revenue Authorities have happily terminated, and the complete scheme of depreciation allowance in respect of gas-works plant and appliances is published to-day in our "Correspondence" columns, under a letter from the Committee. In this communication, the Committee announce the final settlement of the scheme, and acceptance by the Inland Revenue Authorities, and mention that, in the form in which the scheme is now published, it will be circulated by the authorities to their surveyors for acceptance by any gas company who so desire. Thus ends what once threatened universal chaos in the industry regarding this matter, and interminable warfare and strained relations with the authorities. The gas companies (though the scheme may not meet with the views of all as to the allowances to which they consider themselves entitled) owe their gratitude to the Committee who have handled this matter with a masterly skill and diplomacy, and the members of which have had it constantly in mind since January last. Under the circumstances that a settlement was bound to take the course of a compromise, the scheme is a satisfactory one; it was not to be expected that the companies would gain on every point. Anyway, most gas companies, as well as the Inland Revenue Authorities, will be heartily glad that an agreement has been at length arrived at. The Committee recommend the agreed scheme (which has been only slightly altered since its first appearance, but sufficient to make its publication in final form of importance) for adoption by gas companies all over the country. But, of course, any gas company is perfectly at liberty to refuse to subscribe to it, and an appeal is open to them exactly as before. But with what highly probable result? To the scheme assent has been given by statutory gas companies representing a large proportion of the capital of private gas enterprise in the country; and this fact alone endorses it in a manner that will make it practically universal in its application. It will now have to be an exceptional case that will win a departure from an agreement which will gladly be accepted as a guide by the ruling authorities.

Co-Operative Activity in Gas Trading.

THE commercial affairs of the gas industry are universally very much in evidence to-day. We are now frequently receiving from the British Commercial Gas Association the literary, advertising, and artistic products of their expert staff. We cannot open the pages of our American contemporaries without seeing the existence of a very live commercialism running through the gas industry on the other side; and, if we do not mistake the portents, it is going to result (as here) in centralized and co-operative educational and advertising effort. In Germany, we see the same thing. Reference is again made, in other of our columns this week, to the work there. In France, too, the technical gas men at their conferences pay greater attention than ever to the advances of the commercial side of the gas business. This

prominent consideration of a broader commercial policy is stimulating; and we are, as are progressive gas men generally, glad to hear of all organized or other endeavour in the direction of expanding and solidifying the commercial interests of the industry, wherever it has planted itself. This activity is a vital necessity accompanying new and ever-increasing competition. Competition such as the gas industry has to meet not only from the electrical industry, but from the petrol air gas, acetylene, producer-gas, suction-gas, and oil-power people, compels a trading activity such as can only be directed by the best acuity and not by any mediocre ability or intelligence. We have a strong belief in competition in industry and commerce, so long as the competition does not produce a supply so largely in excess of the demand that the participants in the trading rivalry cannot, through cut-throat prices, make a living out of their industry and enterprise, no matter the form it takes. Of this we are perfectly confident, that the gas industry is a far stronger embodiment of what a technical-commercial industry should be because of the competition it has had to encounter than it was before, and that this has sharpened wits, and has enabled the industry to give considerably extended service, through the improved applications of its prime commodity, to every one of the strata composing our social system.

The industry in large part is appreciative of every educational and protective means to the end of fortifying its commercial position; and this is a good sign of the times. Were it otherwise, it would be a reflection upon the commercial spirit and prescience of the industry's administrators. The words "in large part" are here used; but there is a well-grounded hope that it is only a matter of time when others, who for more or less sound reasons remain yet outside the ranks of the commercial co-operators, will enlist themselves, and be of the most enthusiastic. There are, however, several administrations who are fully alive to the value of co-operation, and who join in some of the special co-operative work, but yet who do not see that every new effort in this direction will benefit them. They are entitled to their own views; yet we cannot but hope that many more converts will be found for all approved co-operative endeavour that has for its purpose mutual advantage. Vigorous co-operative work—educational and protective—is a development coincident and essential to the changed conditions and enlargement of the gas industry. The workers of the industry have a robust faith in their prime commodity; and they intend that the industry shall continue to expand. To secure enlargement means harder and harder work; but the larger the industry grows, the greater the value of the interests that have to be protected.

We shall see and hear at the Manchester Conference of the British Commercial Gas Association early next month how largely the spirit of mutual interest possesses many of the men of the industry. It is a spirit the seeds of which have been well sown; and these seeds will continue to fructify. Everything points to it. The year is not far hence when, providing the management of the affairs of the new organization continues to be conducted on the present high plane of enthusiasm, intelligence, and appreciation of requirement, the Association's position and influence will be second to none among commercial agencies of the day that have for their fundamental purposes the education of the community for enhancing commercial prosperity, and the protection of the interests of the industry concerned. The proceedings at Manchester will help to bring the Association and its work in very corporeal form before the section of the industry unidentified with it, and before the country as a whole, if publicity of the proceedings is thoroughly provided for. Some reference was last week made in a general way to the programme; this week the exact terms of the *agenda* are published. It has already been seen that handsome civic recognition of the value of the services of the Association is being made by Manchester and Salford; and the programme of business, it was shown, would be varied so as to meet all tastes. It must be remembered that this order of conference is something new for the industry. There is nothing in this country, or at any rate in the British gas industry, that serves as precedent or model, nor anything of a similar character with which we can compare the meritorious aspects of the programme.

In the gas industry we have been accustomed to technical matters concerning manufacture, distribution, and application forming the bulk of the items for consideration and discussion at meetings. Here, at this conference, things are entirely reversed. We are out now for business, and business alone. Commerce will supply all the constituent elements for the proceedings at the meetings; and there will be nothing more technical about them than the technic of commerce. This in itself is important. Commerce is a science and art; and both science and art have to be applied to the trading of the gas industry to-day, and to meet the position created by the commercial methods of competitors. It is not sufficient for one's commercial system in the gas industry to be creative; it has to be protective also, and the one is not of less moment than the other. The "Science "of Salesmanship" is the final item on the *agenda* for the conference. It will take the form of an address by Mr. A. F. Sheldon, who has founded successful schools in America and in this country. That, however, in passing. In the two capital words of the title of his address—"Science" and "Salesmanship"—there is an extent and depth of meaning over which it is well for those interested in the commerce of the gas industry to pause and meditate. In addition to the President's Address, Professor Lewes' s lecture, the address by Mr. Sheldon, and the general business, papers will be contributed, both for information and to open discussions, by Mr. H. James Yates, Mr. George Clarry, Mr. J. Ferguson Bell, and Mr. H. H. Creasey. Mr. Yates will treat of the aims and claims of the Association, Mr. Clarry of showrooms in relation to gas supply, Mr. Bell of the development of coke sales, and Mr. Creasey of the campaign among the doctors. It is clear that the subject-matter of these papers should enable a collection of views to be made of vast use to the industry at large.

Electrical Treatment of Gas for Tar Removal.

It is to be hoped the promising experiments in the electrical separation of tar particles from coal gas which have been described in a paper submitted to the Michigan Gas Association by Messrs. White, Hacker, and Steere, will eventuate in a practical and commercial process. If an electrical discharge can clear away fogs, precipitate the objectionable fumes from smelting plant, and cause the deposition of dust from a rotary kiln of a portland cement plant, there is no reason within sight why it should not perform a like office for crude gas in regard to the clearance from it of suspended tar particles, if it can be done at a commercial cost. As a matter of fact, consideration suggests the possibility of the electric discharge being made to perform the service of tar removal from gas without the accompanying injurious effects to the gas of, and more or less incompleteness of result by, the existing methods. Many efforts have been made with the view to obtain alternatives to the established methods; one object being to remove the tar while the gas is hot, in order that the tar in its deposition may not (as is the case in the condensation process) carry down some of the lighter hydrocarbons of the gas, which it is preferable should be kept in it. In the experiments which Professor White and his colleagues have made, and which, so far as they have gone, "offer much "promise of commercial success," the temperatures at which the gas was treated ranged from 75° to 154° Fahr.; and in relation to every experiment the reporters found that the electrical treatment caused practically complete elimination of the tar.

In the part of the paper describing the trials at the gas experimental station at Michigan, it is stated that "the gas "to be purified passed from the retort through a condenser, "then through the electric-separator, and from the separa-"tor to the exhauster." We imagine the test would have been more severe for the electric tar-separator if the gas had not been first passed through the condenser; but we hardly think that in all the trials the gas had a preliminary treatment in the condenser, having regard to some of the temperatures at which it was electrically treated. In view, however, of the effect of precipitating tar in the condenser, it would be interesting, in any statement of specific results of treating gas electrically, to have it mentioned whether or not there had been pre-condensation. However, the trials indicate that a better tar removal was effected in 12 vertical inches of the electric tar-separator than was accomplished in the ordinary commercial plant—a Pelouze and Audouin tar-separator, secondary condenser, tar-washer, and rotary ammonia washer. There is the question of cost. The experiments do not, owing to the makeshift character of the electrical plant in this initial work, allow the cost of treating gas by the method to be stated; but the reported low energy requirement for the treatment of the fumes from a smelting

plant encourages the belief that it will be moderate. We hope the experimenters will pursue their trials, and let the gas industry have further information. What has been shown, to the length the Michigan experiments have gone, is that the tar particles in the crude gas can be more completely removed in a single electric precipitation than by the ordinary plant; and, in the words of the experimenters, if economically by the electric means complete removal of tar at any desired temperature can be assured, "there will "follow fascinating possibilities of increased economies in "condensation, less expensive plant, better ammoniacal "liquor, freedom from naphthalene stoppages, longer life of "purifying material, and richer gas." At the moment, however, the "if" stands out boldly; and confirmation of the results of the experimental work is required by its continuance, and then by larger-scale operation.

Effect of Tar-Surfacing on Vegetation.

It may be safely said that no new improvement has ever been brought forward without someone advancing, more or less legitimately, some objection to it. The use of tar for road-surfacing is one assailed improvement. Its utility is great; and there is now no question as to the propriety of its claim to be a public advantage. It has removed from our daily lives in towns and rural districts the baneful and annoying nuisance of almost incessant dust clouds; and it has protected our trees and plants from the injurious influence upon health-giving conditions of a dust coating. Further, roads have been improved, and against the cost of the work of surfacing there have to be set the credits arising from their preservation and the lessened expense in upkeep and watering. But along come the fishery authorities, and ascribe to tar-surfacing, without investigating thoroughly for other causes, a supposed increase in the mortality among fish in streams; and from other quarters arrives intelligence of tree and plant destruction through the use of tar on the roadways. But in such cases it has generally been found that the large measure of confidence with which the charge has been preferred has had as its opposite such a modicum of evidence in proof that this alone was sufficient to raise doubts as to the fundamental reality of the charge. The isolated character of the instances of both fish and tree destruction submitted as being due to the tar-surfacing of roadways also stood in strange contrast with the superabundant testimony as to no such experiences in other quarters, that doubt as to the genuineness of the indictment (however strong the belief of those responsible for it) was considerably hardened.

Bearing upon the effect of tar-surfacing on vegetation, Herr Fischer, of Stuttgart, has been making a widespread survey; and he cannot find any sufficient substantiation of the allegation as to injury. From Paris a time ago, we heard of the harmful effect of the tar used on the bordering trees of a certain boulevard; and occasionally from elsewhere there has been heard a declaration of similar kind. But how small are these instances when contrasted with the thousands of miles of tree and plant bordered highways that have been treated, in this and other countries, with the product of coal distillation! We will not dispute that negligent carrying of the tar right up to the trees may, when the tar is first applied, have some epidermic effect in the case of certain trees, and might affect delicate plants by the washing down to their roots of certain of the chemical properties of the tar when first applied. But miles and miles of roadway can be, as Herr Fischer says (in the statement of which we give an epitome elsewhere), pointed to that are continuously treated with tar without injury to a single tree, not even the sensitive lime. This indicates the fact that there is a right and a wrong way of treating roadways with tar. Where there is no negligence in the use of the material, there is no harm done to vegetation; where there is negligence, there may be harm to some sensitive trees and plants, but not necessarily. As a matter of fact, there is less reason for harbouring any idea of pernicious effect upon vegetation from road-tarring than is conceivable in regard to the slight and temporary pollution of streams from surface washings after tar has been first applied. When we come to consider that road-tarring really means the preservation for trees of those (when available) life-giving influences—light and sun—which energize the foliage, while a coating of dust on the foliage means the stifling of the natural action of these influences, then we may claim the fact as another advantage to place to the credit of the use of tar on roads. The surfacing of roadways by tar is one of those instances of advance in human convenience and material effect in connection with which the major advantage must succeed over the minor disadvantage.

The Cost of Light.

While admitting that steady progress is being made in the science of illumination, and that the variety of appliances now on the market for supplying artificial light is as surprising as it is bewildering, the "Ironmonger" complains that for the masses of the people very little is done, and some millions of them are very little better off in the matter of artificial light for their homes than they were thirty years ago. Cheaper light, says our contemporary, is what is needed by the nation. Of course, it is—and so is cheaper everything else, including the commodities dealt in by ironmongers. But why the prices of gas and electricity should be expected to go down, when the cost of pretty well everything else is going up, is somewhat difficult to understand. If, as we are told, electricity for lighting purposes is really absurdly dear, its actual cost of production and the price charged for it per unit bearing no sort of reasonable relation to one another, it seems that electric light undertakings, with anything like a fair output, should all be making good profits. Is this the case? It may or may not be a fact that "at greatly reduced prices there is the possibility of an enormous extension of electric lighting which would yield a very much larger aggregate profit than is now received;" but, at any rate, electrical engineers must be given credit for having considered the possibility. The writer is equally hard on the gas industry, consequent, in the first place, upon a conviction that a difference of about 400 per cent. between the prices charged for gas in various towns of the country is sufficient proof of the need for reform. No doubt it would be, if the circumstances in all places and cases were similar—which they are not, and are never likely to be. But he has still another string to his bow. Look at this: "During recent years tar products have risen in price by from 50 to 150 per cent.; and, as everyone knows, these articles form the main source of revenue of our gas companies and corporation gas departments." We should like a little more detailed explanation as to the first part of the statement; and as to its second part, the "everyone" does not include the administrators of the gas industry. Let that pass, however, and turn to the consequent question and its answer: "Is it unreasonable to ask why, if this revenue from bye-products has increased so enormously, no attempt has been made to cheapen the supply of gas, and thus extend its use among the poorer classes? There is only one reason, and it is to be found in the general slowness of intuition and want of imagination of those who conduct the business." Of the latter deficiency, the writer of the complaint cannot justly be accused. So far from having made "no attempt," the gas industry has done, is doing, and will continue to do, all in its power to cheapen the supply of gas. The success that is attending these efforts is greater than our friend imagines. Oil, he says, is still the poor man's light. Very well, as he has the welfare of the masses so much at heart, cannot he prevail upon traders to sell illuminating oil at a lower price? Lamp oil does not seem to be getting cheaper. Why?

"Pall Mall Gazette" and Train Fires.

Before inquiry has been held into the terrible railway disaster at Ditton Junction, and before the bodies of the victims of the occurrence had been carried to their last resting-place, certain people who are apparently interested in the electrical industry have been, with feverish and unseemly haste, trying to make out of the accident capital for that industry, and to raise an agitation, without any evidence to support them, in favour of the conversion of the lighting of trains from gas to electricity. One might with just as much sense ask for the abolition of electric traction because a far greater number of poor fellows have met with their deaths through touching live wires than has ever been officially ascribed to the gas lighting of trains. Some unnamed person, who is said to be a railway man of the highest practical experience, flung down before a "Pall Mall Gazette" representative the other day a telegram relative to the Ditton Junction disaster, and the words on it were: "Five gas; two electric. Those destroyed gas." To anyone of ordinary intelligence and capacity for judgment, these words contain nothing but (if true) a state-

ment of fact; but they do not prove in any way whatever that gas had anything to do with the burning of the train. But this man of so-called distinction who makes a stab at gas without disclosing his identity, jumps to the conclusion that it had, and that the Board of Trade should be made to move in the matter of the eviction of gas from trains. While this excited and fervid individual jumps at conclusions, Mr. Turnbull, the District Superintendent of the northern division of the North-Western Railway, states from his more intimate knowledge, that "two of the carriages"—not five be it noted—"took fire, probably due to the scattering of red-hot cinders from the fire-box of the overturned engine." Mr. Turnbull is probably as high in practical experience as the unknown person who arbitrarily passed judgment in the ears of the "Pall Mall Gazette," upon which paper, by the way, the *rôle* of sensation-mongers does not rest gracefully.

Hypotheses.

The fact that the carriages (only one of which appears to have been a passenger coach) that were destroyed were near the engine is sufficient to suggest that incandescent cinder from the engine was the cause of the conflagration. It was the same in the case of the Hawes Junction disaster. The first carriages (which were gas-lighted), with two electrically-lighted carriages, were burnt; but the rear gas-lighted carriages were not. The same appears to have happened in this case; only the front carriages were destroyed by fire—the rear ones, including both gas and electrically-lighted ones, were not. We make this assertion on the statement of the "Pall Mall Gazette's" distinguished railway official that five carriages were gas lighted; while Mr. Turnbull says that only two of the carriages took fire, and these were near the engine. The remarkable engineer who gave our evening contemporary something sensational to talk about, does not agree that the red-hot cinders came from the engine. He takes it that his theory must be right. When, he remarks, such a smash as the one at Ditton occurs, the first thing that happens is the collapse of the boiler tubes, and many hundreds of gallons of water, with a pressure of 190 lbs. of steam at the back, deluge the fire-box and wholly extinguishes the fire. That is to say, the terrible shock that smashes the boiler tubes does not scatter the red-hot cinders simultaneously; but these wait patiently in the fire-box until they are "deluged" before they allow themselves to be discharged in all directions. According to this distinguished practical railway man, there is a sudden immersion which at once quenches the fire; but he goes on to assert that something else of a remarkable nature happens. "The danger is in the gas cylinder." [He forgets to mention that the gas is not all carried in one cylinder, but a number of small cylinders.] "The concussion cracks the cylinder; a spark ignites the burning gas; and it will go on burning to the height of 4 or 5 feet until it burns out. By that time, it has fired everything combustible near it." But why does not the concussion crack all the gas cylinders on the train; and the same series of events happen in the case of each gas-lighted carriage?

Points for Consideration.

We are also curious to know where the spark comes from that is supposed to, in the electrical interests, alight so conveniently near the escaping gas, seeing that the swamping of the fires has extinguished them. We are also curious to know, with gas under a high pressure, and large cracks being instantaneously developed in the cylinders, whether the gas would not instantaneously disperse, and not hang about with the view to being consumed, in the electrical interests, with a fine deliberation such as is submitted to be the case in this loosely constructed theory to which the "Pall Mall Gazette" has given such prominence. There is also advocacy of steel constructed carriages. In the event of adoption, supposing experience proved that gas was the more dangerous illuminant in respect of fire with wooden structures, then, with the change to steel, gas would be no more dangerous than electricity—in fact less so, as it does not short-circuit, and fuse its conveying pipes, nor does it leave passengers in darkness as was the case with electricity in the underground railways quite recently. Let us conclude this comment with the statement from Major Pringle's report (issued last year) on the Hawes Junction disaster. He wrote: "This is actually the first occasion where it can be proved, beyond question or doubt, that fire was occasioned by burning gas. It has to be remembered also that gas has been in use for lighting purposes for a very long period, and that *during the whole of that time—in fact since the year 1868—there is no case of fire destroying either the lives or bodies of passengers in railway accidents.*" Can as much be said of electrical transmission? Does the "Pall Mall Gazette" require to be reminded of the maxim that urges justice, "*Audi alteram partem.*" Our contemporary ought, if it had wished to be consistent, to have started an agitation, after the terrible sacrifice of life at Clapham and Accrington, against the use of electricity in drapers' establishments. That was surely an oversight on its part at those times.

"New" Toddington or Old Toddington?

Under this heading in the "JOURNAL" for June 25 last, reference was made to a prospectus that had been issued by the Industrial Securities Investment Agency, of 6, Abchurch Yard (the centre of the operations of some of Eaton's old satellites) announcing the sale of 200 6 per cent. preference and 200 ordinary shares of £5 each, at the price of £4 per share. The object of the disposal of these ineligible shares was that "the estate of the holders is now being realized." It looks as though we ought to be very sorry for the holders whose estate is being realized, seeing that the great sacrifice of £1 per £5 share is being made. The preference and ordinary shares carry interest at the rate respectively of 6 and 7 per cent.; and this is guaranteed for three years. Under the circumstances, we wonder who are the unfortunate holders of the shares and who the guarantors. Are they the same persons, and are they closely identified with the direction of this and certain other concerns? It seems the Industrial Securities Agency must have surplus copies of the Toddington prospectuses left over from the circulation in June last, as a lady investor has lately received one, and we find it precisely the same as the one issued in June. So much so is it the same, that it is observed that, while interest is payable on June 25 and Dec. 25, "six months' interest is payable 25th June next." This using-up of surplus prospectuses does not look as though the public have been taking kindly to the particular Company operators concerned at 6, Abchurch Yard.

Power in Textile Mills.

It will be remembered that some time ago a Committee was appointed to consider the relative merits of mechanical and electric driving in textile mills; but on the Committee the only power agent represented was electricity. The owners of textile mills and others were not satisfied that the conclusions of such a one-sided Committee would be as impartial as was desirable for their proper guidance; and thus the electrical effort to steal a march on their competitors was frustrated. It was decided to dissolve the Committee, and so give the Textile Institute a free hand in independently pursuing the inquiry. An introduction was given to the investigation last week at the meeting of the Institute, by the reading of four papers by advocates of steam, gas, oil, and electric driving. A strange thing was that town gas had no representative present to lay its case before the congress—at any rate, we cannot trace that it had. We say this was "strange" because, when consideration is given to the over-all expenses incurred by other systems of driving, a very good case can be made out for the use of a cheap town gas of uniform quality. There has been too much latitude allowed the competitors in working up business on fuel costs alone; whereas in the final result they cannot show the economy that the properly adjusted and maintained town-gas engine can do. The gas paper treated exclusively of producer gas; and the author properly had a dig at suction-gas plant. There is no question about it that the variable quality of suction gas, and the consequent irregularity of engine working, has done more to cause dissatisfaction with gas driving than anything else. In such circumstances, it is only by a smart commercial town-gas man keeping the discontented manufacturer well-informed as to how he can, by displacing the irregular quality of gas by a gas of uniform quality, relieve him of his troubles, and it is only by persistent means, too, that he can keep the manufacturer from lending a ready ear to other competitors. Producer gas plant does yield a gas of more constant quality than does suction-gas plant; but there again cheap town gas for regular working up to fairly large powers, and for intermittent working for powers above, relieves the manufacturer from all concern in the producing plant, and from all the attendant financial responsibility and worry involved by being his own gas maker. The claims of the Diesel

oil-engine and of electricity were put forward on the now well-stereotyped lines. In the deliberations of the Textile Institute Committee, the case of town gas should not be overlooked. No doubt gas engineers in the textile areas will see to this.

The Department of the Government Chemist.

In the first annual report of the Government Chemist, Dr. James J. Dobbie devotes some space to recapitulating the steps which led to the constitution of this new Department. The original laboratory, established in 1843 at Somerset House, was intended mainly for the purpose of checking the adulteration of tobacco; but its scope was afterwards extended so as to include the analysis of almost every excisable commodity. A laboratory was also established at the Custom House, in connection with the analysis of articles liable to duty on importation. In 1894, the two laboratories were placed under one Principal, and became known officially as the Government Laboratory. Subsequently various Government Departments (other than the Excise Department, to assist which it was, as already stated, primarily established) obtained the permission of the Treasury to avail themselves of the services of the Somerset House chemists; and this larger sphere of usefulness was gradually extended until in course of time the laboratory came to undertake work for nearly every Department. With the growth of the demand on the part of the different Government Departments for advice and assistance in matters involving chemical knowledge, it became apparent that the arrangement under which the staff of the laboratory was composed entirely of Revenue Officers appointed by, and subject to the authority of, the Commissioners of Customs and Excise, was no longer a satisfactory one. With the view, therefore, of placing all Departments on the same footing as regards the use of the laboratory, and of promoting the centralization, as far as practicable, of Government chemical work, the Treasury decided to ask Parliament to provide for the expenses of the laboratory under a separate vote, as from April 1, 1911. The permanent scientific staff now consists of the Government Chemist, the Deputy Government Chemist, four superintending analysts, and twenty-one analysts; and besides these, between seventy and eighty temporary assistants are employed who are engaged exclusively on chemical work connected with the Revenue Service. It may be mentioned that the Excise branch of the laboratory, having outgrown the accommodation provided for it in Somerset House, was transferred some years ago to the present building in Clement's Inn Passage.

The Past Year's Work.

The total number of analyses and examinations made in the London branches of the Government Laboratory during the year to March 31 last was 195,170, which compares with 186,044 for the preceding twelve months; while including the samples examined in the numerous provincial stations, the total number of analyses and examinations for the year was 345,181. The work carried out for the Customs and Excise Departments, of course, occupies a considerable part of the Chief Chemist's report; and much was also done for the Admiralty and War Office. One of the matters submitted by the Board of Agriculture and Fisheries had relation to the value for manurial purposes of lime containing much silica. On this occasion, four cases of river pollution alleged to have caused the destruction of fish were dealt with. In one instance the pollution was due to sulphuric acid draining from the refuse of a manure works, in another to sewage, and in the remaining two to the presence of excess of suspended matter. An increase of samples from the Home Office was largely due to special work in connection with the Mines Regulation Act; numerous samples of air from collieries in all the more important coal-fields having been examined. The proportions of carbon dioxide and methane in the samples examined ranged as high as 51 volumes of carbon dioxide and 259 volumes of methane per 10,000 volumes. These, however, are extreme figures, obtained by the analysis of a sample taken from a position which showed a very considerable gas-cap by the ordinary miner's lamp test. On the other hand, return air-way samples were found with as little as 5 volumes of carbon dioxide and 2 volumes of methane. For the Factory Department analyses were also undertaken of air drawn from factory workshops where gas-radiators were in use; the object being "to determine the degree to which the air in various parts of the room was vitiated under the existing conditions of ventilation." Immediately above the radiator the proportion of carbon dioxide amounted to 29·8 volumes, and in one other position to 26·8 volumes per 10,000 volumes of air. In other positions, it was as low as 11·8 volumes. The Old-Age Pensions Act is evidently responsible for a good deal, owing to the necessity for applicants to clearly establish their age. In the absence of the Registrar General's certificate, evidence is sometimes produced in the shape of books, marriage certificates, and other documents. Occasionally it is suspected that the entries pointed to are of more recent date than they purport to be; and that this suspicion is justified is proved by the fact that of thirteen documents submitted for examination owing to their doubtful appearance, in six instances it was found that the writing was of recent date, or that it had been lately tampered with.

PERSONAL.

Mr. Ernest D. Simon, Hon. Secretary to the Smoke Abatement League of Great Britain, and Chairman of the Manchester Branch of the League, has been elected unopposed as a member of the Manchester City Council to represent Didsbury Ward. The new councillor is Chairman of Messrs. Henry Simon, Limited, and is largely interested in social work in Manchester.

The Gas and Water Committee of the Wallasey Corporation report that several candidates for the appointment of Technical Assistant at the gas-works had appeared before a Sub-Committee; and that Mr. George Dixon (of Widnes) was recommended for the post, at a commencing salary of £150 per annum. It was also decided that Mr. G. E. Ashurst (Engineer's Principal Assistant) be appointed Chief Clerk; that Mr. H. Scott be appointed Draughtsman; and that Mr. T. R. Cook be appointed Technical Assistant, at a commencing salary of £100 a year. These recommendations were subsequently approved by the Council.

A very coveted distinction has just been conferred by the King of the Belgians on Mr. Henry Hyman Salomons, who has been decorated with the "Ordre de la Coronne." It may be remembered that some allusion to Mr. Salomons' connection with gas affairs appeared in the "Journal" for Jan. 31, 1911 (p. 283), on the occasion of his completion of fifty years' connection with the Imperial Continental Gas Association. His retirement from the position of Chief Engineer-in-Charge of the Brussels works of the Association was notified at the meeting of shareholders last May. Mr. Salomons, who was present during the proceedings at Amsterdam last week (as reported in other columns to-day), was warmly congratulated by his many friends—personal and professional; and large numbers of those to whom he is well known in England will add their felicitations to him on the signal preferment he has enjoyed.

Mr. Alexander Mackay (who has been appointed Engineer and Manager to the Motherwell Gaslight Company) was presented last week by the Directors of the Montrose Gaslight Company, for whom he has previously acted as Engineer and Manager, with a handsome roll-top desk, suitably inscribed. The presentation was made by the Chairman (Mr. A. Muirden). Mr. Mackay, in acknowledging the gift, said he had always looked upon the Directors as his friends, and he thanked them for their kindly support in all the difficulties he had had to face during his management. A silver-mounted casket was also presented to Mr. Mackay by Mr. A. Gellatly, the foreman, on behalf of the employees at the works. Mr. Mackay returned thanks; remarking that the relations which had subsisted between them had been most agreeable. Mr. James Mitchell, who was formerly Assistant at Dundee, the new Engineer and Manager at Montrose, was during the gathering welcomed by the Directors.

OBITUARY.

There passed away at his residence at Leven, Fife, on Saturday last, after a long illness, ex-Provost Christopher Adamson, in his 76th year. Deceased was for thirty years connected with the Gas Company.

Messrs. James Russell and Sons, of the Crown Tube Works, Wednesbury, announce, with extreme regret, the death of their respected Chairman, Mr. George S. Guy, which took place last Saturday week at his residence, Rose Bank, Great Malvern.

The death took place, at his residence, in Richmond Place, Wishaw, on Tuesday last, of Mr. James M'Namell, at the age of 59 years. For eight years he was a member of the Town Council of Wishaw, and acted as Convenor of the Gas Committee for a number of years.

The funeral of the late Mr. Thomas Schofield, formerly Manager of the Mexborough Water Company, who died at Mexborough at the age of 86, took place last Saturday week. There were present Directors of the Water Company and several of the Mexborough councillors.

The death occurred last Sunday week of Mr. Robert Telford, Chief Cashier to the Newcastle and Gateshead Gas Company, in whose service he had been for 45 years. Deceased, who was

attending to his business duties until within a few days of his death, was 58 years of age, and leaves a widow and a son. He took great interest in the public affairs of Westerhope, where he resided.

Mr. EDWIN C. POLE, Manager of the Neath Water-Works, died very suddenly on Monday of last week. On the previous Saturday he was busy at work, apparently in his usual health; but on the Monday morning he felt unwell, and expired immediately after taking his breakfast in bed. Deceased became Manager to the old Neath Water-Works Company in 1884—a position which he retained on the transfer of the undertaking to the Corporation ten years later.

The sad news has reached England of the sudden death in Buenos Ayres, on Aug. 13, of Mrs. BESSIE BROWN, wife of Mr. R. B. Brown, the Manager of the South Barracas Gas Company. Mr. Brown's appointment to South Barracas was chronicled in the "JOURNAL" as recently as last January; and his wife only arrived to join him on the Friday preceding her death. She had been suffering for some weeks from heart trouble; and passed away peacefully in her sleep. Among those attending the funeral were all the officials and employees of the Gas Company—including Mr. Boutell (a Director), and Mr. W. Upton (the Secretary), who were in South America at the time.

It is with sincere regret that we have to record the death, which occurred at his residence, "Brightlands," Reigate, last Wednesday, of Mr. JOHN LESLIE CLOUDSLEY, whose genial disposition had endeared him to everyone with whom he came in contact. Mr. Cloudsley, who was in his seventy-second year, had been confined to his house for some long time, and finally succumbed to heart failure. He was the younger surviving son of the late Mr. James Cloudsley, of Arbroath, and was in his earlier days engaged with the Gas-Meter Company, Limited. In the year 1872, he joined Messrs. W. & B. Cowan, taking the position of London Manager. At the end of 1883 he became a partner in the firm; and twelve years later, when the business was formed into a limited liability Company, he was made a Director. After the amalgamation with Messrs. W. Parkinson and Co., in 1900, he remained on the Board, and only retired two years ago, in consequence of failing health. He leaves a widow, one daughter, and three sons—one of whom (Mr. J. Leslie Cloudsley) is associated with Messrs. Duckham and Cloudsley, Limited, and the Woodall-Duckham Vertical Retort and Oven Construction Company, Limited. The funeral took place on Saturday, at St. Paul's Presbyterian Church, Redhill, and the interment in the Reigate Cemetery.

University Distinctions for Gas Leaders.

We are gratified to be able to announce that, this year being regarded as the Centenary of the Gas Supply Industry of the United Kingdom, it has been determined by the Senate of the University of Leeds to confer an Honorary Degree on two representative men of Metropolitan gas undertakings and a distinguished gas engineer in the Provinces. The names of those who are to be congratulated on this distinction are Mr. Corbet Woodall, Mr. Charles Carpenter, and Mr. Thomas Newbigging. These degrees will be conferred in October, when the Iron and Steel Institute are meeting in Leeds, and when similar degrees will be conferred also on some few members of that body.

Belgian Patent Suits about Incandescent Burners.

Very few persons who visited the Brussels Exhibition, says "Progressive Age," noted one small room devoted to models or full-sized articles, the subjects of patents which had been taken out through a Brussels attorney. Among them was the inverted gas-burner of Greyson de Schodt, of Namur; and it certainly was no beauty. But just now this invention assumes great importance; for Herr de Schodt is imitating the action of a certain automobile inventor in attacking manufacturers and dealers wholesale, after having for ten years "laid low and sed nuffin'" like Br'er Rabbit. There are not wanting those who say that he is backed by a large manufacturer who has contracts for delivery, which he would rather not fill. A number of the Belgian wholesale firms have already capitulated, and are paying a (not very heavy) license. De Schodt has warned everybody fairly. The defendants have not been idle, and have discovered another "invert" patent, five years older. Some say the two are as like as two peas. In Belgium anyone can patent anything else, no matter how old or how many times previously patented. All that the Government does is to certify to the receipt of a description on a certain date. Further than that, the old motto *caveat emptor* applies. The funny part of the matter is that De Schodt has the sole rights for the Plaissetty mantle in Belgium; but the Plaissetty Company in Brussels sells preferably German invert burners, which are supposed to infringe De Schodt's patent. One wonders why the latter has not attacked the Plaissetty Company long ago. In De Schodt's own establishment in Brussels he sells the Jacob invert burners, because they sell better than his own. The Plaissetty Company is the one that has the "Cerofirm" patent rights for Belgium, and De Schodt has sued this Company also for infringement; so that patent matters in Belgian illuminating departments will soon commence to be interesting.

ELECTRICITY SUPPLY MEMORANDA.

In the Dark—Wanted, a Market for Gas-Cookers—The Electric "Ring"—Thank Heaven for the Simplicity of the Gas-Ring—Economy and Waste at Dover—The Right of Gas Companies to Exist—Narrow-Mindedness and Vague Assertion—The Knowledge of the "Electrical Review."

THE total collapse of the electricity supply of Islington on the 9th inst.—which collapse extended to about twenty-four hours, and through which about 2500 consumers and premises were deprived of electricity, including a couple of prisons, a hospital, theatres and other places of entertainment, the Northern District Post Office, shops, hotels, restaurants, and other more or less important establishments—has been treated as quite an insignificant and ordinary affair by the electrical papers. In dealing with it as insignificant they are, of course, wrong; in dealing with it as ordinary, they are, of course, right. But we will treat our technical journalistic friends over the matter tenderly and even generously; for these occurrences must be as thorns in the flesh, and very awkward to explain as an advantage in the adoption of electricity. For them there have been quite a painful number of happenings recently in which electricity has shown its masterful side over all human endeavour to keep it within bounds, and properly and responsibly performing its destined functions. The inconvenience has been pretty severe for those portions of the community that have been affected. About the Islington occurrence, the "Electrical Review" considered a nine-lined paragraph would suffice to place on record the intelligence of this piece of backsliding on the part of the Borough Council's electricity supply; and eleven lines were regarded by the "Electrician" as meeting the requirements. Two other papers, much more pressed for space judging from the number of their pages, spun out the tale to over thirty lines! There seems to be a want of due appreciation of proportion in certain of our electrical contemporaries between the public importance of certain events and the extent of the information they publish concerning them.

The "Electrical Review" announces that "a correspondent desires to find an English market for electric cookers and hot-plates, and will probably be able to place a large order for export." We know several central station engineers who are anxious to find markets for electric cookers and hot-plates, as well as several manufacturers of these undomesticated appliances. On the other hand, there is that energetic correspondent of the "Electrical Times"—Mr. B. Sankey—who desires to boost-up his day load by finding a market in which he can purchase electric-rings which are as handy and reliable as the gas-ring, and only cost a reasonable sum—reasonable as electric appliances go. Naturally, everybody tells Mr. Sankey he is asking for something that will require a miracle to create; for an ordinary electric hot-plate can never compete in first cost with the gas-ring, nor in running cost, nor will one ever last a normal human lifetime. It is also hopeless to count upon the reliability being at all equal to that of the gas-ring; and, as for time in boiling and other operations, we will draw a veil over the point. Mr. Sankey's reply, in effect, to his critics is: "I am simply pointing out what is needed." He is further quite resigned to the idea that his electric gas-ring can never get in price below 20s. to 30s.; and the manufacturers are doubtful about even such a "low" price as that ever being reached. Mr. Sankey's answer is that what the manufacturers have to compete against is a gas-ring with all connections that can be obtained for 3s. 2d. One tap does all the regulation with this gas-ring; liquids may boil over upon it with impunity; it is proof against any ill-effects from such treatment; and the gas-ring is much better behaved than to administer shocks to the user. Mr. Sankey does not want his electric-ring to have too high a heat—the consumer must learn to have more patience, in these days of rapid locomotion, hustle, and quick heating. The new notion of moving and doing rapidly is quite against the natural slow and sedate heating action of electricity; and really people have been absolutely spoilt by gas pandering to the modern craze for saving time. If in the electric-ring high heats are employed to produce rapid boiling, Mr. Sankey fears this will destroy the utility of the plate for frying purposes and operations where a slow heat is required.

However, Mr. Sankey has now prepared a standard specification for the ideal electric-ring that he hopes to get for from £1 to £1 10s., but which appears to be afar off at the present time. From the specification, we find he wants the hot-plate to be of 7 inches diameter over all, and to have not less than two heats—one low heat of about 200 watts for simmering and warming purposes, and one high heat sufficient to raise 2 pints of water from 60° Fahr. to boiling point within fifteen minutes when using a 7-inch flat-bottomed kettle. Why always quote a starting temperature of 60°? What, too, will happen when the vessel has lost its flat bottom, through the habitual heavy-handedness of the maid? Then the hot-plate is to be so constructed as to render it impossible for short-circuiting, leakages, or damage to the connecting wires or terminals to take place, due to the continued boiling over of hot water, milk, or other liquids. The leading-in wires are to be securely attached to the underside of the plate away from the heat, and properly protected by a metal cover provided with an externally screwed inlet for attaching the union nut of the flexible tubing. This cover is to be fixed by screws easily removable for renewal of cables, but provided with sealing holes for sealing-up with lead seals, also to prevent unauthorized access

to the heating elements. The heating elements, top-plate, and other parts likely to require replacement are to be so arranged that they may be renewed by a competent electrical fitter or jointer without the necessity of returning the whole plate to the makers. The flexible connection is to consist of 4 feet of three or four conductor flexible cable, of suitable current capacity, contained in a flexible metallic tube. There are other conditions attaching to the flexible tubing; but we will go on to the control box. This is to consist of a standard conduit box having inlet and outlet at the top and bottom ends for ⅜-inch screwed or wedge grip conduit. The outlet at the bottom is to be provided with a brass adapter suitable for attaching thereto the union nut on the flexible metal tube. There is to be mounted upon it a "Diamond H" series parallel cooking switch, with an indicating dial controllable by the switch and operating in the following order—viz., "Off," "High," "Low," "Off," and so connected that the break shall occur between the "Low" and "Off" positions. For circuits having an earthed return, there is to be one S.P. "Dial," "Zed," or other suitable type of fuse; and for circuits having two live wires, two similar S.P. or one suitable D.P. fuse. There is also to be one standard bayonet socket lampholder for a red pilot lamp, so connected that the lamp shall be alight when current is passing. Thank Heaven for the simple gas-ring!

Dover evidently badly wants some new Town Councillors. The tremendous growth of the cost of the public lighting service through the action of the Council in supplanting Gas Company supplied street-lamps with municipal electricity supplied lamps caused a cry for retrenchment. The councillors then considered that the most effective way of producing the much-needed economy was the subtilely thought-out plan of extinguishing the lamps a short time after the public-houses closed, or thereabouts. Now it seems that many of the residents of Dover are night workers and walkers; and these among others have frankly told the Council that "the menace to life and property has been unreasonably increased, while the danger to vehicular and pedestrian traffic does not require elucidating." Thereupon the Borough Electrical Engineer suggests that the trouble may be overcome by putting in a certain number of incandescent electric lamps for use in the arc-lamp lighted streets when the arcs are out, and that where the streets are "illuminated" by incandescent electric lamps the control should be altered, so as to allow some remaining alight when the others are switched off. But why all this pother about the street lighting when electricity is vaunted as the "cheapest" illuminant in the world! Perhaps after all some electricians have been deceiving themselves, as well as their councils and the public. While there is all this trouble first over the expense and then over the means taken by the Council to produce economy, this same Council have instructed the Education Committee to consider the cost of installing the electric light in all the borough schools. In other words, while they are striving to effect in one direction an economy necessitated by the expense of electric lighting, they are giving instructions to see what waste can be electrically perpetrated in another direction. The small demand that there is for illumination of any kind in schools can hardly supply the electricity department with anything worth having, while the expense of securing this little is not warranted from any point of view. It is waste; and there is no other word for it.

Dealing with this perennial subject of municipal waste in the endeavour to assist municipal electricity undertakings, gives an opportunity for referring to a discussion which recently took place in the Wakefield City Council on the subject of the lighting of the Market Hall. The Gas Company competed with the Electricity Department, and won on all points—just as gas has won at Blackpool, at Leeds, and at other places in the lighting of the markets. In this instance, the gas tender was £15 17s. 6d.; the electric tender, £51 2s. 9d. The latter figure, however, included wiring. But again upon that the installation of electric lighting would have occasioned the provision of a heating apparatus, the cost of which should be added to the electric lighting. Under these circumstances, it was an act of correct municipal administration, and was in the interests of the ratepayers, for the Committee who had charge of the matter to recommend the acceptance of the Gas Company's tender. When, however, the matter came before the Council, Mr. Councillor Hill gave vent to all the old fatuous and illusory talk about the Corporation advertising the Gas Company, and showing the public that the Corporation cannot supply the Market Hall with electric light as cheaply as the Gas Company can supply gas light. Is it possible that Mr. Hill cannot rise to a higher conception of municipal duty and administration than to think that the creation of patronage for the dearer municipal commodity is the sum and substance of that duty and administration? Between every municipal service there should be a distinct line of demarcation; and each service should be conducted in the most economical and efficient manner quite independent of municipal possession of the electricity concern. Why should the costs of lighting—capital expenditure, running costs, wear and tear, and depreciation—of the public lighting services and of the lighting of establishments under municipal control, all be increased in order to benefit the municipal electricity department? The municipal council who can show their ability to carry out the letter and spirit of the Acts controlling local expenditure by inviting and accepting the lowest tender for an equivalent or better value for these public services than can be given by a municipal commodity is the municipal council that is animated by the highest ideals of duty.

The Mr. Councillor Hill to whom we have referred seemed to find cause of complaint in the fact that "gas companies up and down the country were competing with municipal electricity supplies." Why should they not? Who started the competition? Were not the gas companies serving the public long before municipal electricity supplies came on to the stage of our mundane affairs? We have to live and let live; but the narrow-mindedness of some of our municipal councillors would, could it have full fling, pronounce an immediate death sentence on gas companies in the interests of municipal electricity trading. Then this same Mr. Councillor Hill made this statement in reference to the Gas-light and Coke Company: "At Westminster, the Gas Company actually quoted a price which was unremunerative to them. This was obviously done with a view to crippling or killing the local electricity undertaking, or, at any rate, retarding its growth." Perhaps in making this statement Mr. Hill was the innocent mouthpiece and tool of someone else. We do not know. But in making the statement he was treading on what has proved dangerous ground for others in the electricity industry. We invite Mr. Hill to tell us who was his informant; and as he has made himself publicly responsible for the statement in Wakefield, perhaps he will support the statement by enlightening us as to the grounds on which he is satisfied that what he said is correct. Against this stupid tirade as to gas companies having no right to commercial activity, existence, and freedom where a municipal electricity supply is in existence, Mr. Alderman Atkinson administered a very proper rebuke, in which was interwoven a due appreciation of the duty of the Corporation to the ratepayers. Does it not occur to Mr. Councillor Hill that, as the largest ratepayers (in most towns the gas undertaking is the largest, or nearly the largest, ratepayer), the Gas Company are entitled to the protection of the Corporation, just as much as Councillor Hill himself is—and, owing to the degree of their contribution to the public exchequer, perhaps more? "There seemed," said Alderman Atkinson, "a desire to get hold of the Gas Company, and squeeze the life out of it. If they did squeeze the life out of it, they would at the same time squeeze the life out of the large number of people the Company employed; and they would also squeeze the life out of the ratepayers who would have to pay the rates now paid by the Company." These are words of wisdom, and stand in strong contrast to those used by Mr. Hill. It is true that besides being large ratepayers, the Gas Company employ, in their operations of gas production, more men in proportion to business done than the Electricity Department, through the operations necessitating a large amount of manual labour, and not being so largely a mechanical operation as is the generation of electricity. We shall be very interested to hear from Mr. Hill on the matters raised in these two paragraphs; but let him remember that the Gas Company have as much right to consideration as (perhaps more than) the Electricity Department or——Mr. Councillor Hill.

As announced in our news columns last week, the Dudley Town Council have admitted that, in their case, municipal management of electricity supply is a failure, and they have determined to cut the painter, and sell the undertaking to the Power Company operating in the area. There is nothing much to say about this determination; but a point that arrests attention is one of the reasons that those opposed to the sale has attributed for the failure of the concern as a paying venture. The dear old "Electrical Review," which occasionally runs its head against a brick wall owing to its pompous assumption of infinite knowledge, the other week touched on the question of "unaccounted-for gas," and showed completely that it understands nothing whatever about the effect upon the registration of gas of differences of temperature between the works' station meters and the consumers' meters situated in the cold cellars or cupboards in the consumers' premises, nor as to the effect of condensation, and other factors bearing upon the question. No one suggests that all gas distribution systems are bottle-tight; but our contemporary, ignorant of quite elementary physical questions relating to gas distribution and supply, seems to think that unaccounted-for gas must mean absolute leakage from the mains. However, that merely in passing. Our contemporary speaks of the obligations on electricity suppliers to keep their current at home in the cables. For the safety of subterranean metal work, we sincerely wish they complied with their obligations. The opponents of the Dudley transfer are satisfied that they have found the secret of the non-paying characteristic of the concern. It is simply this, that the units actually paid for in the last accounts numbered 364,688, while a further 197,500 units were generated but were not paid for. We do not say this is the reason for the inability of the concern to show itself as a shining example of commercial success. But the opponents of the transfer allege it; and so perhaps the "Electrical Review" will give them one of its solemn discourses on the folly of trying to explain things that one does not understand.

An account (which is accompanied by illustrations and plans) of the newly opened filter-house near the Brushes reservoir embankment of the Ashton-under-Lyne, Stalybridge, and Dukinfield (District) Water-Works Joint Committee will be found in last Friday's number of the "Engineer." A similar filter-house at Ashway Gap, Greenfield, has also been extended; and the two installations comprise 36 Mather and Platt pressure filters, designed to deal with 5,352,000 gallons of water per day collectively. The opening ceremony is referred to in another part of this issue of the "JOURNAL."

INTERNATIONAL GAS EXHIBITION AT AMSTERDAM.

SEPTEMBER 14 TO OCTOBER 6.

Opening of the Exhibition and Description of the Exhibits—Visit of Dutch Engineers and Foreign Guests.

[By Our Own Correspondent.]

The Corporation of Amsterdam have organized, with the collaboration of the Association of Gas Engineers of Holland, an International Gas Exhibition, which was formally opened on Saturday, the 14th inst. The exhibition, which is in the Paleis voor Volksvlijt or Palace of Industry, remains open until the 6th of October, and there can be no question but that it will stimulate the use of gas in Holland by directing the attention of the public to the manifold and indisputable advantages of gas as a lighting and heating agent.

The general arrangement and the scheme of decoration of the exhibition have been carried out under the supervision of a firm of architects, Heeren Heineke and Kuipers, of Amsterdam, and thereby the clashing of a large number of different designs and colour-schemes, which commonly occurs in the stands at such exhibitions, has been avoided. There are 135 trade exhibitors, and in addition the Corporation of Amsterdam have brought together a collection of apparatus, illustrating the advance in modes of lighting from the time of Ancient Rome to the present day. The Committee who have been responsible for carrying out all the arrangements for the exhibition consists of the following gentlemen: J. van Rossum du Chattel (Chairman), Chief Engineer of the Amsterdam gas undertaking; J. Diephuis, the Distributing Engineer, G. A. van Everdingen, Head of the Administrative Department of the gas-works, and M. van der Horst, Assistant Engineer in Charge of the East Gas-Works of Amsterdam; O. S. Knottnerus, Managing-Director of the Dutch Indies Gas Company, of Rotterdam; J. M. Muller, Assistant Engineer in Charge of the West Gas-Works, of Amsterdam; M. C. Sissingh, Chief Engineer of the gas undertaking of Rotterdam; and Chr. K. Visser, principal Assistant-Engineer of the gas undertaking of Amsterdam. This Committee are to be unreservedly congratulated on the success which has attended their work of preparation and inauguration, and no doubt the public and the exhibitors will have every reason before the close of the exhibition to express great satisfaction for the benefits which they will have derived from the labours of the Committee. The awards in connection with the exhibits and theses are being allotted by a Jury consisting of Heeren O. S. Knottnerus (Chairman), of Rotterdam, J. E. H. Bakhuis, the Chief Engineer of the gas-works of The Hague, N. W. van Doesburgh, Chief Engineer of the gas-works of Leyden, C. O. Heuvelink, Manager of the gas-works at Batavia, Professor F. K. Th. van Iterson, of Delft, C. T. Salomons, Assistant-Engineer of the gas undertaking of Rotterdam, and R. Zijlstra, Manager of the gas-works at Amersfoort.

The Paleis voor Volksvlijt, where the exhibition is housed, is an imposing building, mainly of iron and glass, erected nearly half-a-century ago with somewhat the same objects as the Crystal Palace at Sydenham. It embodies a large theatre, a concert hall, a number of annexes, and some pleasant grounds. It is in the main hall, its annexes, and a temporary building that the gas exhibits are disposed; the various stalls being numbered in series corresponding with the descriptions in the catalogue in a way which makes it easy to visit all in turn. The catalogue contains also a number of views showing the more interesting features of the gas-works of the Corporation of Amsterdam.

Official Opening of the Exhibition.

The opening of the Exhibition at Amsterdam took place in the "Paleis voor Volksvlijt," in presence of his Excellency Heer Talma, Minister of Agriculture, Commerce, and Industry, and of Heer Serrurier, Senior Alderman of the City of Amsterdam, and a great number of guests. The following notes of the proceedings at the ceremony have been supplied by a local correspondent.

Heer van Rossum du Chattel first extended a welcome to all present, especially his Excellency Heer Talma, who had already given his assistance in the preparation of the exhibition. He then explained the purpose of the exhibition, which is twofold—first, to furnish a complete survey of all the newer applications of gas for lighting, as well as for domestic and industrial purposes; and, secondly, to teach the public how to make use of gas as economically as possible. Concerning gas lighting, much has been done of late years. Since the invention of the incandescent mantle by Dr. Auer von Welsbach, continual improvements have been introduced. First there was the inverted burner, and then high-pressure gas lighting in its multifarious forms. But it is not only these improvements that it is necessary to bring before the public. It is a well-known fact that very often the lighting of private houses is not as economical as it might be, and that in many cases the public are satisfied with 50 or 60 per cent. of the light which they could get from the gas if used in a proper way. And as with lighting, so it is with the application of gas to cooking, &c. Here, too, the public must be taught to be as economical as possible; and it is the duty of a gas undertaking to do this, even though the consumption might thereby not increase as much as it would otherwise have done. In order to teach the public how to make the best use of gas, lectures will be delivered during the exhibition, and all kinds of information will be given. He then named the firms who have furnished the lighting of the different parts of the exhibition, and the entrance and façade of the building. So far as they are foreign, all of them are German. English firms, with some praiseworthy exceptions, are conspicuous by their absence, which is very much to be regretted, because England is not only the country where the gas industry had its origin, but it is also leading all the others in respect of gas consumption per head of population, and undoubtedly other countries have still much to learn from England concerning the use of gas. The fact that the consumption of gas in England is so much larger than on the Continent, must be put down to the prudent line of conduct of the English gas undertakings in selling gas as cheaply as possible. This example has been followed in Holland for some years, and is beginning to attract attention in Germany as well. Again, the introduction of prepayment meters, which has done so much to make gas popular, originated in England. Subsequently some data were given concerning the production of gas in Amsterdam from August, 1898, when the Municipality took over the gas-works from the Imperial Continental Gas Association, down to the present date. The annual output increased from 31,000,000 cubic metres in 1898 to 93,000,000 cubic metres in 1912; whereas the capital invested increased only from 17,000,000 florins in 1898 to 21,000,000 florins in 1912. The number of meters in 1898 was 25,500, including 916 prepayment ones; and in August, 1912, there were 118,143, of which 68,746 were slot-meters. In these fourteen years the total production of gas was 936,000,000 cubic metres, from 2,749,000 metric tons of coal and coke. The consumption is still increasing, notwithstanding some less favourable influences of later years—the inverted burner, which uses less gas than the upright form, the sharp competition of electricity, the compulsory shutting of shops at an early hour, the introduction of suction-gas plant, &c. Heer von Rossum du Chattel thanked the Executive of the Association of Dutch Gas Engineers (who had invited representatives of foreign Associations of Gas Engineers to be present), the ladies and gentlemen who had undertaken to give lectures during the exhibition (Mev. Coeterier-Schröder, Mev. Korff-Klaasesz, Mej. Oppenheimer, Mej. Wittop Koning, and Heeren Geerling, Muller, v. d. Horst, and v. d. Meersch), and finally all who had contributed to the success of the enterprise.

Heer Serrurier then declared the exhibition open, amid loud applause.

Raison d'etre of the Exhibition.

The catalogue of the exhibition has an introduction in which it is pointed out that the exhibition happens to coincide with the celebration of the centenary of the first practical use of gas on a large scale for public and private lighting. It was in the year 1812, it is observed, that the Gaslight and Coke Company, who are responsible for the lighting of half of London, was founded. The advent of a means of lighting whereby the public had only to turn a tap and light the gas in order to obtain light for any length of time without further trouble, marked an epoch in the history of artificial lighting. Gas, like all important novelties, met at first with strenuous opposition on the most diverse grounds. But it outlived it; and now much capital is remuneratively invested in gas undertakings. The Gaslight and Coke Company, from a capital of £200,000 and the carbonization of 4000 tons of coal per annum in 1812, has advanced to a capital of £30,000,000 and an annual consumption for gas making of 2¼ million tons of coal at the present day. From these and other particulars of the progress of gas as exemplified in the career of the Gaslight and Coke Company, the compilers of the catalogue go on to quote the advance which has been witnessed in recent years in Amsterdam in the use of gas. The comparative figures for the year 1898, when the gas undertaking was taken over by the Corporation from the Imperial Continental Gas Association, and for the latest corresponding date or period are:

	1898.		1911-12.
Number of workmen and officials . . .	983	..	2,335
Annual make of gas, millions of cubic feet.	1,092	..	3,283
Number of meters in use	25,500	..	118,143

The figures quoted go to prove that the gas industry is extremely flourishing; and in Amsterdam it is almost literally true that there is "no house without gas." But the exhibition will serve a useful purpose in helping to teach the public how to burn gas to the best advantage. Especially is this desirable at the present time in connection with the use of gas for heating rooms, cooking, and for warming water. In towns, gas is preferable for these purposes, if only because it does not pollute the air with smoke. Moreover, the latest types of gas-engines can effectively compete with electric-motors; and in Berlin, London, and elsewhere high-pressure gas-lamps are displacing electric arc lamps for public lighting. The Association of Dutch Gas Engineers have offered a prize for the best description presented of a combined gas-fire and coke-stove. The engineers on the staff of the

Corporation gas undertaking will give lectures, during the exhibition, on gas manufacture, the use of gas, gas-engines, and the chemistry of gas. Other lectures are being given on ironing, washing, and cooking by gas. Finally, it is pointed out, in the introduction to the catalogue, that the exhibits are numerous and representative, and that in order to accommodate all of them it has been necessary to erect a temporary building of over 16,000 square feet in area in the grounds of the Palace of Industry.

General Exhibits.

The centre of the main hall is appropriately reserved for the historical and local exhibits of the Amsterdam gas undertaking. Among these, pride of place naturally is accorded to the first atmospheric gas-engine (with vertical cylinder) for which Dr. Otto was awarded the Grand Prix at the Paris Exhibition of 1867, and the first horizontal four-cycle gas-engine, for which he again received the Grand Prix at the Paris Exhibition of 1878. These two gas-exhibits have been lent by the Amsterdam branch of the Deutz Gas-Engine Works. Heer J. Klever, of the Coal Trading Association, of Utrecht, has lent an interesting collection of fossils from coal measures. Messrs. Burt, Boulton, and Haywood have provided a well-displayed selection of products derived from the distillation of coal tar. A collection of lighting appliances, from early torch holders and ancient Roman porcelain lamps to the more modern oil-lamps, including ships' and miners' lamps, has been lent by a Dresden firm. A "tree" of products derivable from coal tar and an illustration of the manurial value of sulphate of ammonia are also shown. An exhibit which attracts much attention from the general public is a machine for counting and packing in rolls of forty the 2½ cent. Dutch bronze coin, which, though only the equivalent of the English halfpenny in value, is the coin by which most of the prepayment gas-meters in Holland are worked. The machine is used by the Amsterdam gas undertaking for dealing with the enormous number of bronze coins which are collected from its prepayment meters. The packets of forty of these coins, which are delivered by the machine, have a value of one gulden, or Dutch florin, and are disposed of to the post offices and banks, by which they are supplied on demand to the public. The operator merely feeds the coins on to an inclined plane attached to the machine. Other exhibits on the Corporation stand are a plaster of Paris model, one-tenth natural size, of a regenerative setting of nine horizontal retorts, with all parts detachable, and a zinc model on the same scale of a 24-inch Walker centre-valve as used at the East Gas-Works at Amsterdam. The distance pneumatic lighter devised by Heer P. M. Warners, an Inspector of the Corporation gas undertaking, is here shown. It is designed with the object of preventing any risk of the valve sticking or holding-up. Various other models of gas-works' plant have been supplied by other members of the staff of the same undertaking. On the wall of one end of the main hall is a large diagram displaying the growth of gas consumption from year to year in Amsterdam. The price of gas is now 7 cents per cubic metre (about 3s. 4d. per 1000 cubic feet), with a slight increase in the case of that supplied through prepayment meters. From the roof are suspended, among flags and banners, screens on which pithy advice to use gas is couched in various languages. Similar commendations and apothegms regarding gas appear at the foot of many of the pages of the catalogue of the exhibition.

Trade Exhibits.

The exhibits do not appear to be grouped in classes. That would indeed be almost impracticable, since some firms produce very diverse descriptions of plant and appliances. We propose to indicate briefly the exhibits which appear to be most interesting, for one or another reason, and follow the catalogue sequence in doing so.

There are fifty-seven stands in the main hall, in addition to the central stand of the Corporation of Amsterdam already referred to. The first, adjoining the principal entrance, is that of the Dutch Welsbach Incandescent Light Company, who show apparatus for lighting by high-pressure gas, and high-pressure air on the "Colonia" system, as well as many patterns of incandescent burners, street-lanterns, &c., apparatus for burning-off mantles, gas-fires, geysers, &c. Many of the Company's exhibits are of German or Belgian manufacture. Elster and Co., of Rotterdam, are affiliated with the Birmingham, Berlin, and Vienna firms of the same name, and have an interesting display of meters. These include an 800-light dry meter with glass case, through which the whole interior parts are visible, prepayment thief-proof meters for the 2½ cents Dutch bronze coin, numerous small meters with glass casings, including one with Rutten's safety device, which is also shown in detail, Crossley pressure recorders, experimental meters, pressure-gauges and gauge boards, and a Junkers calorimeter with accessory equipment. Near by, the Globe Safety Gas Syndicate are showing ordinary and self-acting Junkers geysers, and a coffee-making machine (in use) and a gas-boiler made by W. M. Still and Sons, Limited, of London, for whom the exhibitors are agents in Holland. One of the automatic geysers, which delivers hot water up to a rate of over 65 gallons per minute, claims to be the largest gas geyser on the market. The flood of hot water which it delivers certainly is phenomenal, and may serve to convince people that gas is well adapted for providing large intermittent supplies of hot water for schools, bathing establishments, factories, &c. The George Wilson Dutch Gas-Meter Works, at The Hague, have a good display of dry and wet meters of all descriptions, including a dry meter for 200 lights, with glass case. Governors and various special meters and controlling appliances are shown by them, and a system of incandescent lighting which has been adopted for the coast lights at Scheveningen. The cooking apparatus of Junker and Ruh, which is well known in Germany, is shown on a neighbouring stand. Considerable originality and good artistic sense are displayed in the gas fittings and fires of the firm of W. J. Stokvis, of Arnheim, who show some gas-fires with the English type of incandescent "fuel," as well as the reflector style of fire which is more usual on the Continent. Other firms which also show English pattern gas-fires are Bus and Co. and Van Lith and Co., both of Rotterdam.

Broadly speaking, there are very few British firms directly exhibiting, but the Dutch agents exhibit many of the best known British makes of heating appliances, &c. Thus Ewart's "Califont" and "Lightning" geysers appear on N. V. Van den Berg and Co.'s stall. Several patterns of the gas-fires of John Wright and Eagle Range, Limited, are shown by the "Goederenhandel" firm of Amsterdam and The Hague. The Central Workshops of the German Continental Gas Company have a good display of their special types of gas cockers, fires, and water-heaters, and of meters and the "Askania" distance-lighter. A very convenient pipe wrench, known as the "Platina," is worth attention, and heaters for irons, &c., with automatic ignition and control of the heating flames, are shown by J. Norden, Junior, of Amsterdam—being made by a Cologne firm. Friedrich Lux shows specimens of his well-known purifying material, of his specific gravity balance, distance-lighter, and of Bauduin's distant indicators of gas pressure and of water-level, as well as other apparatus. The stand of the Company for the Manufacture of Gas-Meters of Dordrecht, situated at one end of the hall, is one of the most interesting in the exhibition. It contains models of a novel type of station meter, in which a high capacity, with a small diameter and a low back-pressure, is obtained by a system of compounding the drums, end to end, of a number of smaller wet meters, as well as a "safety" meter for the avoidance of large escapes of gas from open taps at night-time.

The annexe on the Frederiksplein side of the main hall contains twenty stands. N. V. Gautzsch's Incandescent Light Company, in addition to "Pharos," "Prometheus," "Askania," and other German special types of apparatus for the use of gas, show a small ventilating fan, driven by a small gas-heated engine, which occupies no more space than the motor of an electric fan. Messrs. Samuel Cutler and Sons, Limited, show photographs of work executed by them in various parts of the world, including entire gas works, gasholders, carburetted water-gas plant, and the mechanical equipment of gas-works. John Harper and Co., of Willenhall, have a stand on which may be seen their gas-steam radiators, gas-fires, &c. The well-known photometric appliances of Schmidt and Haensch, of Berlin, are well displayed, together with other gas-testing apparatus by G. B. Salm, of Amsterdam.

In the Restaurant Hall there are ten stands. The First Dutch Thorium and Incandescent Gas Light Works show, *inter alia*, the productions of the Bland Light Syndicate, Limited, of London and Manchester. The Burroughs Typing and Calculating Machines, as adapted for gas-works book-keeping, are exhibited by P. H. Vermeulen, of Amsterdam. The Stettin Fire-Brick Works show fine models of regenerative settings, and specimens of retorts and slabs and bricks for retort-settings. The Berlin Anhalt Engineering Company have a very interesting exhibit, including most of their latest specialities. A new pattern of flueless gas-heating stove is displayed by Van Ploeg and Co., of Amsterdam.

At the end of the Lecture Hall, the Association of Dutch Gas Engineers show instructive wall charts and diagrams of the gas supply of Dutch towns, and a collection of literature relating to gas. The garden building contains the remaining forty-seven stands, on several of which there are exhibits of machinery in motion. A model of an installation of the Rincker-Wolter plant for gasifying oil-residues, tar, &c., as used at the Utrecht gas-works, is shown by the Dutch Residues Gas Company, of Rotterdam. George Bray and Co., Limited, have a large and very well-arranged display of their world-renowned burners, and the Union Stove Works, of New York, show several types of their "Astor" stoves and gas-fires. There are several exhibitors of pumping plant; and small gas-engines are shown, in many cases in action, by Benz and Co. (Crossley Bros.' agents), the Fafnir works of Aix-la-Chapelle, and H. Hahn and Co., of Amsterdam. A Wilton furnace for breeze is exhibited by the Deventer Iron Foundry and Engine Works, and Keith high-pressure burners by Nieuwmeijer and Co., of Amsterdam. It may be remarked that this building is wholly lighted by Keith high-pressure gas-lamps. Heinrich Koppers, of Essen, shows models of carbonizing plant, and a large number of fine photographs of installations, among which those at the Vienna gas-works are noteworthy, carried out by him. Aug. Klönne, of Dortmund, has a fine model of a bed of 12 horizontal carbonizing chambers, and photographs are shown of gas-works plant erected by him.

It must not be imagined that reference has been made above to all the interesting features of the exhibition—only a few could be dealt with in a moderate compass. English gas men would find that the exhibits would more than compensate them for the trouble of a journey to Amsterdam, which is within about twelve hours of London. They will be sure of a hearty welcome and an experience which will be as enjoyable as instructive.

Meeting of Dutch Gas Engineers and their Foreign Guests.

The Association of Gas Engineers of Holland took advantage of the opportunity afforded by the opening of the International Gas Exhibition to hold a special meeting of its members on Wednesday and Thursday last, to which invitations were extended to a number of their *confrères* in other countries. The guests from England, France, Germany, Belgium, Norway, and Sweden gave a truly international character to the function, which was marked throughout by a cordiality and reciprocity of good fellowship which will long remain in the memory of all those who were fortunate enough to be present.

The Reception Committee and the Guests.

The arrangements for the meeting had been made by a Committee of the Dutch Association, of which Heer O. S. Knottnerus, of Rotterdam, the Managing-Director of the Dutch Indies Gas Company, was President, and Heer N. W. van Doesburgh, the Manager of the Leyden gas undertaking, was Hon. Secretary. Invitations had been sent to the Presidents of the representative Gas Associations of other countries, with the result that delegates were present from all the countries named above. Unfortunately, Mr. Corbet Woodall, the President of the Institution of Gas Engineers, was (much against his will) persuaded that he would run serious risk of overtaxing his strength by undertaking the visit to Amsterdam in the midst of many other important engagements; and the pleasing duty of representing the Institution fell upon Mr. Edward Allen, of Liverpool, the Senior Vice-President, Mr. S. Y. Shoubridge, of London, the Honorary Secretary, and Mr. W. T. Dunn, the Secretary of the Institution. Mr. F. W. Goodenough was also present as representative of the Gaslight and Coke Company, in lieu of the Governor of the Company; and, incidentally, as Chairman of the Executive Committee of the British Commercial Gas Association, he represented that body also. Mr. Charles Carpenter, the Chairman of the South Metropolitan Gas Company, found himself at the last moment unable to be present as the representative of his Company, and deputed Mr. Charles Franks, of the Bankside Works, to take his place. Of others who had received personal invitations to the gathering, there were present: Mr. W. J. Atkinson Butterfield, of London, Mr. Samuel Cutler and Mr. Samuel Cutler, junior, of Millwall, Mr. A. F. Hayman, the Engineer of the Antwerp Station of the Imperial Continental Gas Association, Mr. H. H. Salomons, of Brussels, and Mr. Walter King, of London.

Two pleasing incidents of a personal nature may here be fitly mentioned. Mr. Salomons was able to receive the congratulations of his numerous friends present—practically the whole company—on the news which reached him on Wednesday last that the King of Belgium had conferred on him the distinction of Chevalier of the Order of the Crown, in recognition of his lifelong services to the public in his capacity of Gas Engineer and Manager at Brussels. Readers of the "Journal" will recall that only a short time ago Mr. Salomons retired from that position, after completing fifty years in the service of the Imperial Continental Gas Association, and will know how well deserving he is of the honour which Belgium has now extended to him. The second incident was the presentation, which Mr. Charles Carpenter had hoped to make in person, of souvenirs of the meeting, in the form of a cigar and a cigarette case respectively, to Heer O. S. Knottnerus, the President, and Heer N. W. van Doesburgh, the Hon. Secretary of the Dutch Association. These cases were in silver, with the flags of Great Britain and Holland enamelled in colours above the engraved initials of the recipients. The souvenirs, of which Mr. Charles Franks was the bearer, were each accompanied by a letter in Dutch expressing Mr. Carpenter's great regret at his inability to offer them in person.

The Société de l'Industrie du Gaz en France was represented by M. Masse, of the Paris Suburban Gas Company. The German Association of Gas and Water Engineers was represented by Herr K. Lempelius, of Berlin, who is the Secretary of the Central Gas Publicity Organization of Germany. The Association des Gaziers Belges was represented by M. Busine, of Mons.

Reception and Visit to the Exhibition.

The President and Committee of the Dutch Association held a reception on Wednesday evening in rooms on the east side of the Paleis voor Volksvlijt, in the main portion of which building the International Gas Exhibition is housed. Heer O. S. Knottnerus, the President, addressed a few words (in French) of cordial welcome to the guests of the Association, and expressed a hope that their visit would prove very pleasant, and that they would find the gas exhibition of interest. M. Masse acknowledged the welcome, in words so well chosen and so clearly enunciated that they were understood and appreciated by all present—including some who professed complete ignorance of the French tongue. Mr. Edward Allen also briefly acknowledged the welcome on behalf of the Institution of Gas Engineers and the English guests. He also congratulated the Committee on the fulness and interesting character of the exhibition, to which he had already paid one visit. Herr Lempelius made acknowledgments on behalf of Germany; and regarding the exhibition, he said it surpassed any effort of the same character which had ever been made in Germany. M. Busine finally acknowledged, on behalf of his Belgian colleagues, the welcome of the President and Committee. The company then proceeded round the Gas Exhibition, in regard to which a detailed report is given on another page.

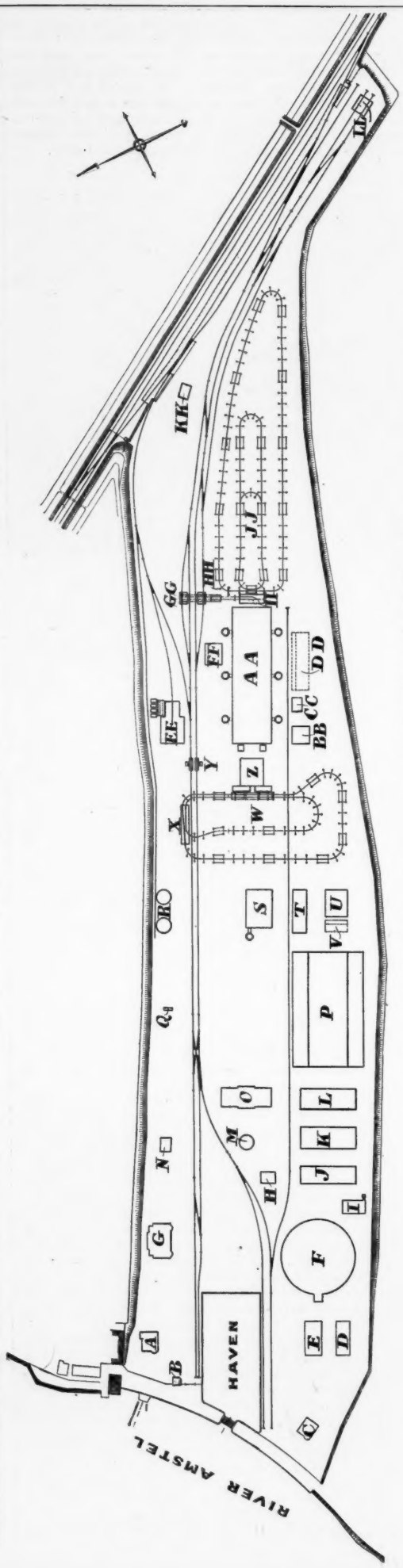


Fig. 1.—PLAN OF THE ZUIDER GAS-WORKS, AMSTERDAM.

A. Residence of Manager-in-Chief. B. Gatekeeper's Lodge. C. Residence of Engineer. D. Governor-Room. E. Station-Meters. F. Gasholder. G. Head Offices. H. Inspectors' Offices. I. Boiler-House.
J. General Workshops. K. Stores. L. Blacksmiths' Shop. M. Water-Tower. N. Residence of Chief Inspector. O. Workmen's Room and Lavatories and Laboratory. P. Purifier-House. Q. Pipe-Press.
R. Tar-Tanks. S. Boiler-House. T. Exhausters and Electricity Works. U. Washer and Tar-Extractors. V. Underground Tar and Liquor Tank. W. Coke Telpher-Track. X. Coke Storage Bunker for Sales.
Y. Weighbridges. Z. Coke-Handling Plant. AA. Retort-House. BB. Condenser-House. CC. Vacuum and Pressure Tanks. DD. Underground Tar and Liquor Tank. EE. Sulphate of Ammonia Plant.
FF. Workmen's Rooms, Bath Rooms, and Laundry. GG. Waggon-Tippers. HH. Coal-Conveyor. II. Coal-Storage Bunkers and Coal-Breakers. JJ. Coal Telpher-Track. KK. Residence. LL. Railway-Engine House.

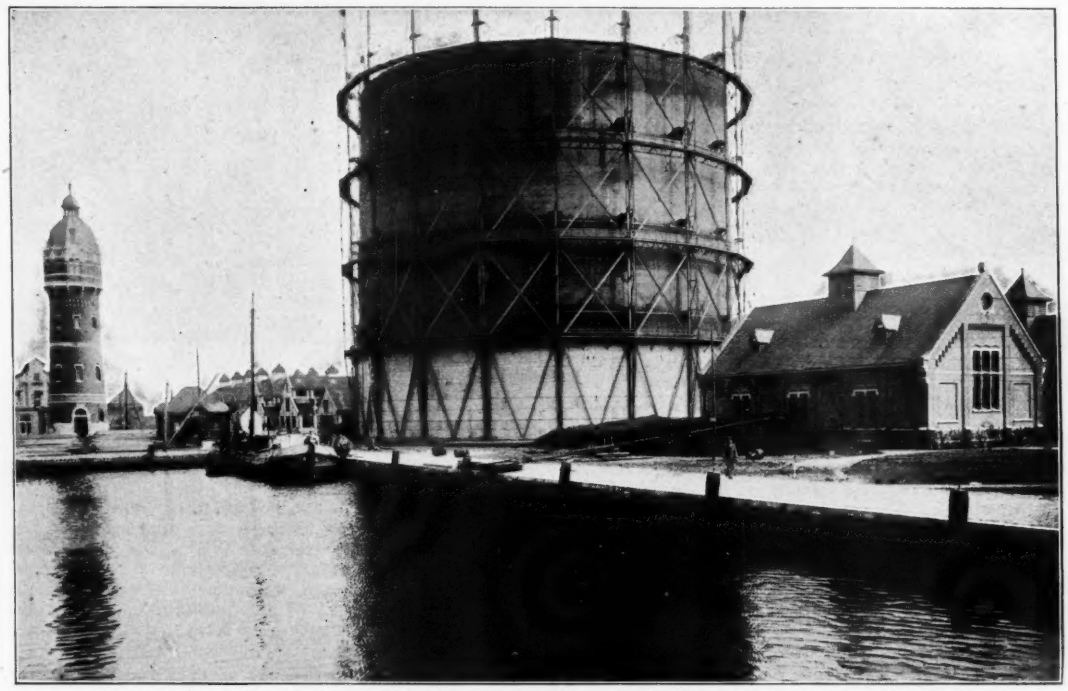


Fig. 2.—View of the Gasholder and Water Tower at the South Gas-Works, Amsterdam (from the Quay).

Steamboat Excursion on the Amstel.

The participants in the meeting re-assembled on Thursday shortly after noon at the landing stage opposite the Amstel Hotel, where two steamboats received them for a trip up the River Amstel. Fine, bright weather prevailed, and the two boats proceeded side by side at a leisurely pace as far as the pretty suburb of Ouderkerk; the site of the South Gas-Works now in course of construction being passed *en route*. Lunch was served on board; and the strains of a band enlivened the proceedings. Turning at Ouderkerk, the steamers on the way back halted at the landing stage of the new South Gas-Works, where the party landed for an inspection of the constructional work in progress. A plan of the new works, which will be completed in the course of the next year, is given below (fig. 1), together with particulars of the buildings and principal items of plant and apparatus which are being installed thereon. The striking features (*vide* the views figs. 2, 3, and 4) of the works at the present time are: The gasholder, of nearly 2¼ million cubic feet capacity, in a steel tank, which is already completed; the well-proportioned water-tower; and the retort-house, the ridge of the roof of which is 93 ft. 6 in. above the ground level of the works. The six benches, each comprising five beds of eighteen Dessau vertical retorts, are being equipped with mouthpieces and fittings; and the coal-hoppers, charging-shoots, and coal and coke conveying plant above the benches are in course of erection. This portion of the equipment of the retort-house is being provided by Messrs. Samuel Cutler and Sons, who are also erecting the telpher line and coke-handling plant for the coke yard and the coke storage tank, &c., as well as the waggon-tip and coal breaking, screening, and elevating machinery, and other steel-work and machinery for the new works.

Zuider Gas-Works.

The area occupied by the Zuider Gas-Works is about 30 acres; and a further 52 acres are available for extensions. The main building is the retort-house, which is 308 feet long, 88 feet wide, and 93 feet high. It contains six benches of five settings, each with eighteen vertical retorts. Thus there is a total of thirty settings and 540 retorts. The length of the retorts is 13 feet, and the maximum daily output 6,360,000 cubic feet. In the retort-house there is coal-storage equal to forty hours' requirements. By an underground passage communication is provided between the retort-house and the workmen's rooms and bath-rooms, where are to be found modern bath arrangements and receptacles for clothes, well ventilated and easily cleaned.

The plant on the works includes four water-cooled condensers (6 ft. 6 in. by 6 ft. 6 in. by 27 ft.); two exhausters (capacity 2,120,000

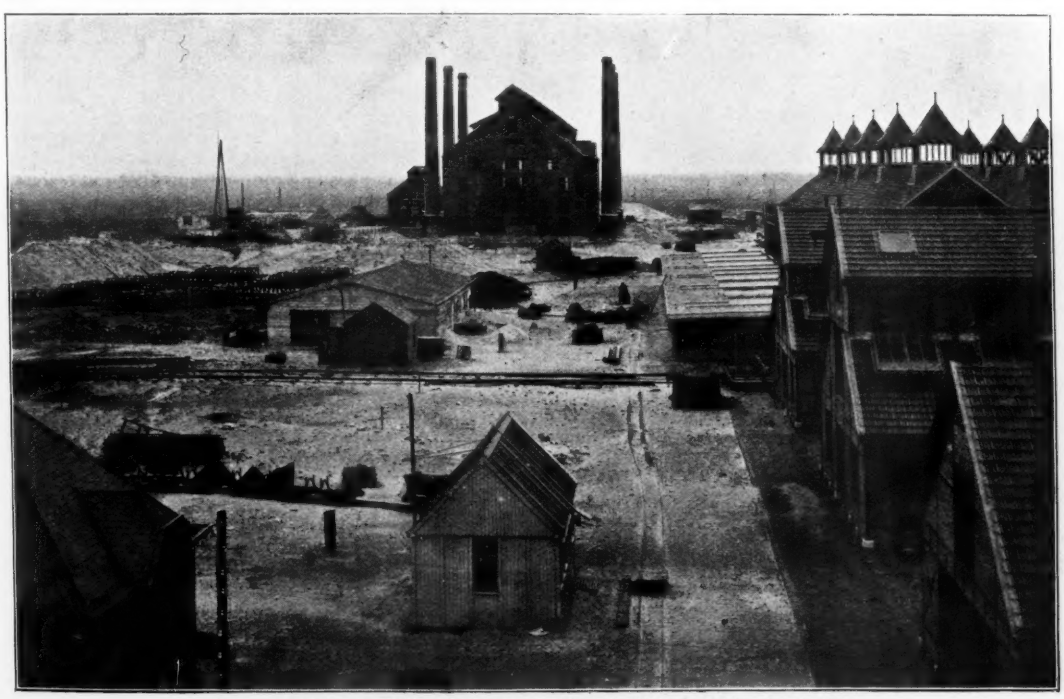


Fig. 3.—Constructional Work in Progress at the South Gas-Works, Amsterdam.

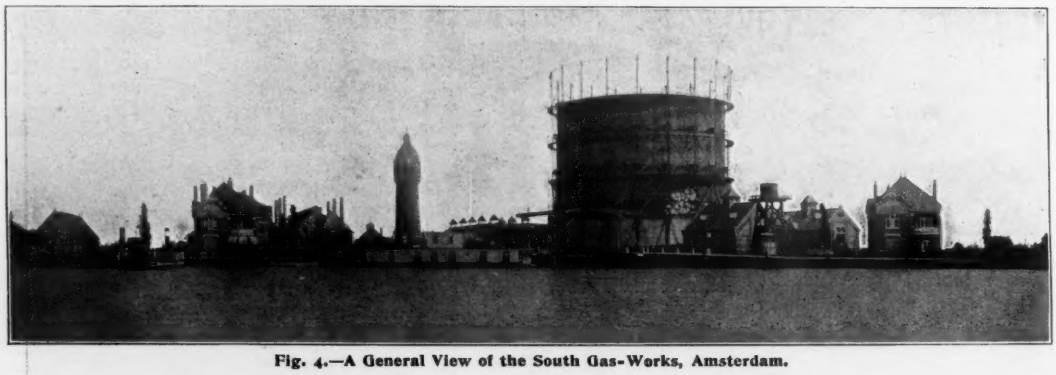


Fig. 4.—A General View of the South Gas-Works, Amsterdam.

cubic feet), with accommodation for a third; three "Standard" washers (capacity 2,120,000 cubic feet); three tar-extractors (capacity 2,120,000 cubic feet); sixteen luteless purifiers (24 ft. by 28 ft. by 6 ft.), with improved Jäger grids; three station-meters (one of 3,500,000 cubic feet, and two of 2,120,000 cubic feet capacity); one governor (capacity 8,500,000 cubic feet), with accommodation for a second; and two station-governors (capacity 5,300,000 cubic feet), with accommodation for a third. Steam is provided from two boiler-houses, containing respectively two and five Steinmüller boilers; and the electrical works are of a capacity of 300 units. By means of two overhead and two underground tanks, 240,000 gallons of tar can be stored. Two underground tanks and a tank in the water-tower provide the same storage capacity for liquor. The water-tower is 148 feet high, with a tank of 37,400 gallons capacity, for Amstel River water.

In connection with the sulphate of ammonia plant, there are two stills (with space for a third), each of 11,000 gallons capacity; and nearly all the work is carried out mechanically. The sulphate is loaded into railway-trucks, which for this purpose are run into the building. There is an engine-house to accommodate two locomotives; and the Amsterdam-Utrecht Railway communicates with the works. Coal is delivered by rail or water; the harbour being equipped with two electric derricks and a coke-loader. The coal is conveyed from the harbour by railway waggons, over two weighbridges, to two waggon-tippers. By means of a conveyor, the coal is then placed in a bunker, from which either a second conveyor feeds the retort-house, or a telpher takes the coal into store. There is a De Brouwer conveyor to remove the coke to the coke-handling plant; and a telpher takes it to a bunker for sale or places it in the yard. Two lifts are provided to take the coke to the furnaces.

The works are lighted by 52 high-pressure lamps of 1500-candle power. Gas is supplied to the town through two 36-inch main-pipes.

The buildings have been carried out for the most part by Dutch contractors; the retort-benches by the Stettin Fire-Brick Works; and German, Dutch, and French firms all have a share in the construction and provision of plant. The plans and drawings for the new works have been prepared throughout by Heer J. van Rossum du Chattel, the Chief Engineer of the Amsterdam gas undertaking, who has been ably assisted by Heer Chr. K. Visser, the Assistant-Engineer, who is resident on the new works and is directly supervising the constructional work. A second house has been provided on the works for Dr. Terneden, the Chief Chemist of the gas undertaking.

After the inspection of the new works, the steamboats were again boarded, and the return journey to Amsterdam was completed on them. The foreign guests of the Dutch Association each received on board an interesting souvenir of the occasion in the form of a paper-knife, with the arms of Amsterdam enamelled in colours on the handle. A concise description, in four languages, of the new works, with plan, was also handed to all who participated in the visit.

The Banquet.

In the evening (Thursday), the members of the Dutch Association and their guests dined together in the tastefully decorated banqueting hall of the Maison Couturier. Heer O. S. Knottnerus, of Rotterdam, presided, and, at the high table, to his left were: Mr. Edward Allen, of Liverpool; Heer van Rossum du Chattel; Mr. S. Y. Shoubridge, of London; Dr. Delprat, one of the Aldermen of Amsterdam; Mr. F. W. Goodenough, of London; Heer Bakhuis, the Manager of The Hague Gas-Works; Mr. H. H. Salomons, of Brussels; Heer N. W. van Doesburgh, the Manager of the Leyden Gas-Works; and Mr. Charles Franks, of London. To the right of the Chairman were Heer Serrurier, Senior Alderman, representing the Burgomaster of Amsterdam; Herr Lempelius, of Berlin; M. Masse, of Paris; Mr. A. F. Hayman, of Antwerp; Heer Bolsius, the Manager of the Bois-le-Duc Gas-Works; M. Busine, of Mons; and a number of civic dignitaries.

The toast of the foreign rulers was proposed first from the chair at an early stage in the banquet, according to the Dutch custom of interspersing the toasts at intervals throughout the meal, instead of reserving them until its close, as with us. The orchestra gave strains of the various national anthems; and Mr. Edward Allen then gave the toast of the Queen of the Netherlands, with a few pithy words on the traditionally good relations subsisting between Great Britain and Holland, and the instinctive wisdom, goodness, and tact of Queen Wilhelmina. The National hymn was sung with enthusiasm.

Fig. 5.—The West Gas-Works, Amsterdam.

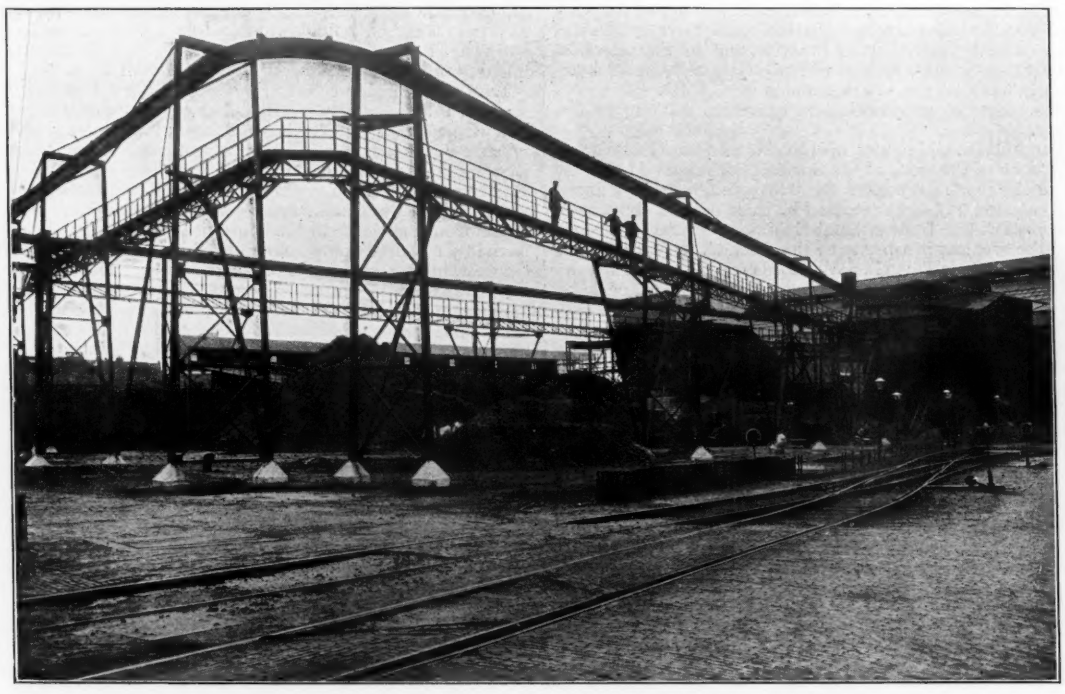


Fig. 6.—Telpher Conveying Plant at the East Gas-Works, Amsterdam.

The next toast, given by the Chairman, was that of the City of Amsterdam, and of its Gas Department in particular. He referred to the prosperity of the city and to the immense strides which the gas-works had made, first under the able management of the late Heer van der Hoorst and subsequently under the present Engineer, Heer van Rossum du Chattel. Heer Serrurier, the Senior Alderman, in responding, took the opportunity to refer to the great ability shown by the latter gentleman in his management of the gas undertaking, in which he was so well supported by the Chief of Administration, Heer G. A. van Everdingen, and the technical staff.

Heer J. van Rossum du Chattel, speaking in English, next gave the toast of the English visitors, who, he said, had braved the risks of sickness in travelling to Amsterdam in response to the invitation of the Dutch Association. There was great similarity between the peoples of Great Britain and Holland—both countries were in themselves small—and there was frequent intercourse between them. They travelled to and fro in friendship—the English Institution came to Holland in 1897, and the following year the Dutch gas engineers returned the visit. Mr. Allen was well known to many of those present, as was also Mr. Shoubridge. Mr. Goodenough represented the Governor of the largest gas undertaking in the world; Mr. Franks represented the Managing-Director of the next largest Company. Both Mr. Corbet Woodall and Mr. Charles Carpenter were always ready to welcome Dutch gas engineers at any of their works. A telegram had been received from Mr. Woodall expressing deep regret at his inability to be with them that evening, and saying that he hoped to welcome them all in England next year. They missed Mr. Charles Carpenter, who likewise deeply regretted his absence. The reception which he had given some of them, with their German *confrères*, at the East Greenwich works two years ago, was fresh in their memory. Mr. Salomons represented the Imperial Continental Gas Association, who had been so closely identified with gas supply in Holland; and Mr. Walter King was respected for his association with "the best technical journal in the world." Mr. W. T. Dunn was also well known to them for his courtesy as Secretary of the Institution of Gas Engineers.

The toast was drunk with enthusiasm. Mr. Edward Allen, in replying on behalf of himself and his English colleagues, said that he regretted his inadequacy to fulfil the duty which should have been another's, but the latter's misfortune had brought him the good fortune of being present that evening (in place of Mr. Corbet Woodall) as representative of the Institution of Gas Engineers. In this capacity, he desired to thank very much Heer van Rossum du Chattel for his expressions of good will and the reception which he had given them. He recalled that his predecessor at Liverpool, Mr. William King, was always delighted to welcome members of the "Vereeniging van Gasfabrikanten in Nederland" when they visited England. There were many bonds of sympathy and brotherhood between the English and Dutch peoples. England owed very much to Holland; and many Dutch families had settled in and enriched the blood of England. The traditions of both peoples stood for *liberté* and *egalité*, but above all for *fraternité*. In regard to gas men, this was more especially the case—their machinery and their processes were open to one another, as they had no reason to be afraid of disclosing secrets. Gas was gas whether in an English or a Dutch town; and they could all freely help each other in matters relating to it. As to the exhibition which they had seen in Amsterdam, he greatly admired the ingenuity and skill shown in the arrangement of the exhibits, which, moreover, were most interesting. They had enjoyed a delightful trip on the river that afternoon, and in the new gas-works he was struck with admiration for the architectural and engineering skill displayed in their design. He hoped that the Municipality of Amsterdam would derive great benefit from them. In conclusion, he trusted that his hosts that evening would not consider that his gratitude to them was to be measured by the poorness of his remarks.

Herr Lempelius, in the course of a long speech of thanks on behalf of himself and German colleagues, for the reception and entertainment given by the Dutch Association, expressed the pleasure which it gave them to meet their Dutch *confrères*, who were second to none in the technique of gas manufacture and supply. In regard to the Amsterdam exhibition, it was the most wonderful gas exhibition which had been held on the Continent. The Dutch had by their exhibits shown themselves *facile princeps* in the artistic character of their gas pendants, brackets, &c.—such as those exhibited by the firm of W. J. Stokvis, of Arnheim,—in many of which the supply pipes were so well concealed that they were indistinguishable from electrical fittings. The new gas-works at Amsterdam reflected the highest credit on Heer van Rossum du Chattel and on the gas engineers of Holland.

M. Masse, of Paris, in responding on behalf of the gas engineers of France, spoke of the kind manner in which the Corporation of Amsterdam had received their guests. He then referred to the expansion of the gas supply, and to the provision of the new works which they had visited that afternoon for the needs of the immediate future. Great credit attached to Heer van Rossum du Chattel for the magnificent works now in course of erection. Finally, the evening's entertainment was beyond praise.

After a short speech by Dr. Delprat, one of the Aldermen of Amsterdam, on behalf of that city, M. Busine, the President of the Belgian Society of Gas Engineers, in thanking his hosts, referred in terms of highest appreciation to the very interesting gas exhibition and to the new works. Mr. Salomons, of Brussels, also spoke (in French, as the recognized language for an international assembly), in admiration of the new gas-works, in respect of which, he said, previous speakers had "cut the ground from under his feet." He greatly appreciated this opportunity of meeting former colleagues, and could only regret that so many of his colleagues of the past—among whom he named Heer van der Horst and a few others—had passed away. He regarded gas engineers of all nationalities as his colleagues, but to his Dutch friends he would say that he would prefer to spend his last days among them.

After a few words from Alderman Josephus Jitta, who, like the Chairman, had referred to the good work done in connection with the gas undertaking of Amsterdam by Heer Visser, Dr. Terneden, and other members of its technical staff, Heer Visser, the Assistant-Manager, expressed thanks for the appreciative references to him and his colleagues. The toast of the Chairman was proposed in felicitous terms by Heer Blom, the Manager of the Haarlem Gas-Works. Heer Sissingh, the Chief Engineer of the Rotterdam gas undertaking, spoke in reference to the great work which had been accomplished by German gas engineers. They could all unite in the effort to spread the use of gas in all countries, and gas men of all nationalities could come to a common understanding in this

respect. The International Gas Exhibition showed how truly international was the gas industry. In technical literature, in the application of technical study to practice, and in the scientific solution of gas problems, their German colleagues always were pre-eminent. German gas managers also set an example to the world in the matter of co-operation on questions relating to the gas industry.

Heer Bauduin, the Manager of the Maastricht Gas-Works, spoke in French of the work of the Société Technique du Gaz en France, and of French gas engineers. He remembered how finely the Dutch gas men had been received by their French colleagues on the occasion of the International Exhibition in Paris in 1900. He wished the greatest prosperity to the Société. Heer Bolsius, Manager of the Bois-le-Duc Gas-Works, also speaking in French, referred in a felicitous manner to the good relations which subsisted between the Belgian gas engineers and their Dutch colleagues. He mentioned that Stockholm and Christiania were also represented in that evening's gathering. Heer Bakhuis, the Manager of The Hague Gas-Works, gave the toast of the Committee for the International Gas Exhibition, referring especially to those who had in effect formed the Executive Committee by which the detail work had been carried out—viz., Heeren J. Diephuis, G. A. van Everdingen, M. van der Horst, and J. M. Muller. The next speaker was Heer D. Verschuere, Alderman and Chairman of the Gas Committee of Amsterdam. He was followed by Herr F. Lux, of Ludwigshafen-on-Rhine, who gave a vigorous recitation in German verse and a short speech expressing his enjoyment of the evening. Finally, the Chairman referred to the guests; and the most enjoyable entertainment closed with renderings of the various national songs.

Before bringing this report to an end, mention should be made of the pretty menu card of the banquet, which had on one side reproductions of etchings of the new South Gas-Works and of a view of old Amsterdam, for which Heer Blom, of the Haarlem Gas-Works, was responsible. The works from which Amsterdam is at present supplied with gas are the West Works, of which fig. 5 gives a view, and the East Works, an interesting part of which is seen in fig. 6.

GAS PROPAGANDA IN GERMANY.

Reference was made in the "Journal," in connection with the report of the paper which Dr. Lempelius read, on "Novelties in Connection with Gas," before the meeting of the German Association of Gas and Water Engineers in June last, to the propaganda work which is being very actively carried on in Germany by the "Central Organization for Promoting the Sale of Gas," of which Dr. Lempelius is the Secretary. [See "Journal," Vol. CXIX., p. 30.] In South Germany, the Central Organization has a very active representative in Dr. E. Schilling, of Munich. We propose in the sequel to refer briefly to some of the literature issued under the auspices of this organization, which corresponds with the British Commercial Gas Association in this country.

First and foremost, attention should be drawn to the special "Gas Centenary Issue" of the "Illustrirte Zeitung*—an old-established weekly illustrated paper which occasionally issues special numbers devoted to a particular subject. The gas centenary number has been prepared with the help of the Central Gas Publicity Organization already referred to. It may be worth while to indicate briefly the manner in which the manufacture and use of gas and its bye-products have been presented to the general public. The first page gives a reproduction in colours of an allegorical picture by Professor Alois Kolb, entitled "A Modern Prometheus." In the first article, Herr Hans Dominik refers to the conquest of fire by man; and this is followed by an article by Dr. H. Potonié, of Lichterfelde, describing the origin of coal and its mining. This is illustrated by pictures of the vegetation which prevailed when the coal measures were being formed, and of the working of coal mines. The next article describes various installations of coal-handling and transporting plant made by the firm of J. Pohlig, of Cologne. A reproduction of a water colour showing a portion of the Tegel Gas-Works at Berlin, by Walter Hammer, is of a very striking character. An interesting article, by Dr. E. Schilling, of Munich, follows, describing "One Hundred Years' Progress in the Gas Industry." Herr Hans Lint writes on "Gas Manufacture in Gas-Works and Coke-Ovens." Both these articles are illustrated by a number of interesting views of gas-works and gas-works plant past and present. Next comes an article on water-gas and other manufacturing apparatus as constructed by the firm of Julius Pintsch, of Berlin. Herr Ernst Meier, of Berlin, describes the large coal-store which was erected to his own designs at the Tegel works. Then follows an article descriptive of the unloading and conveying plant produced by Messrs. Adolf Bleichert and Co., of Leipzig. Gasholder construction as carried out by F. A. Neumann, of Eschweiler, is next dealt with. One of the illustrations attached to this article is of the gasholders with wooden-guide columns which were in use at the Imperial Continental Gas Association's works at Cologne in 1841. The illustration which is given of the latest development in gasholder construction is, perhaps, rather unhappily selected, as it is that of the 7 million cubic feet holder at the Grasbrook works at Hamburg which collapsed with such disastrous consequences in 1909. [See "Journal," Vol. CVIII., p. 733.]

Large carbonizing chambers of the Munich type are next described, and then coke-oven machinery and equipment, in connection with which a very striking birds'-eye view of a large installation of coke-ovens with coal-washing and coke-screening plant at Bergmannsglück (Westphalia) is given. Herr F. Schäfer, Chief Engineer of the German Continental Gas Association's works at Dessau, discourses in an entertaining manner on the distribution of gas from the works to the consumer and methods of using gas. A vividly coloured double-page reproduction of a picture, by Fritz Gärtner, of the quenching of the coke as it is discharged from coke-ovens forms the centre piece of the number. Steel tube manufacture and flexible metallic tubing are described in other articles, which are followed by descriptions of exhausters and blowers. An article which will be read with interest by many gas engineers is one describing the long-distance main by which gas is conveyed from the coke-ovens at Hamborn to the gas-works at Barmen, over 30 miles distant. The gas is pumped through this main at an initial pressure of 2 atmospheres; and the quantity dealt with is at present 1060 million cubic feet per annum. But the installation will suffice to meet all demands up to 3500 million cubic feet per annum. The manufacture of gas-meters is described; and Dr. W. Bertelsmann writes on the development and present position of the production of light from coal gas. An impressionist picture, by Hans Licht, of the Askania Platz in Berlin lighted by high-pressure gas is reproduced in vivid colours. A reproduction is also given of A. Talmage's picture of Trafalgar Square. Various other illustrations are given of high-pressure gas lighting. A group of portraits of distinguished German gas engineers follows.

The gas supply of Vienna is described in an interesting article, in connection with which illustrations are given of the large carbonizing chambers at the Leopoldau works and the coal-handling plant at the Simmering works. The largest gasholder on the Continent—viz., that of 8,830,000 cubic feet capacity in the XXth District of Vienna, which was constructed by the M.A.N. firm of Augsburg, and which is to receive the gas from the Leopoldau works, 7½ miles distant—is also shown. It will be remembered that this is the gasholder of which the top curb gave way while the holder was being tested for soundness twelve months ago. [See "Journal," Vol. CXV., p. 478.] The development of the German Continental Gas Company's operations is fitly described; and there are articles on the use of gas for heating, and on the proper employment of gas for cooking. The use of gas for filling balloons and air-ships is referred to; and an interesting article by Herr Möllers, of Essen, is given, on the industrial importance of the bye-products of gas. Dr. Allner, of Dessau, furnishes an article on the use of bye-products of gas manufacture for the production of power in Diesel engines. Other articles follow on the use of tar as fuel for such engines and for locomotives. Acetylene is dealt with in an entertaining fashion by Herr Theo Kautny, of Cologne. A number of other articles and some coloured plates in this monumental gas number of the "Illustrirte Zeitung" have not been referred to in detail.

An amusing leaflet issued by the Central Publicity Organization is a dramatic sketch in eight acts entitled "The Last Word on Electric Cooking." The scene is laid at an electro-technical exhibition at Leipzig on an evening in June; and in the first act members of the public approach the buffet at which hot sausages are being dispensed. Two grills are visible behind the screen, one of which is electric. But this is not in use; while gas men among the customers notice that the other grill, on which the sausages are being cooked, is heated by gas. Inquiry of the attendant elicits the fact that the electric grill would not meet the brisk requirements, and that it is only occasionally used. The scene of the second act is laid at a confectioner's stall, where an inquirer learns that there is a large electric baking oven which consumes 15s. worth of current in the day (at a price of 1·2d. per unit). It is equal to baking 3000 small rolls, such as are usually sold in Germany at four for 1d., and the cost of current works out at ¼d. a roll! There are six more acts, in which the fallacies of the exponents of electrical cooking are dispelled. The final act is at the chief restaurant of the exhibition, where the gas man's cutlet is grilled over a coal-fire; the chef explaining to him that it takes fifteen minutes to heat up the electric grill, and that the expenditure of current, therefore, is too great, while the patience of customers is unduly tried thereby. The chef added that in other respects the electrical apparatus was very good!

Among the other attractive leaflets issued by the Central Publicity Organization may be mentioned one with insets showing various domestic operations in which the saving of time that gas effects, and the consequent increase of leisure of mistress and maid, is effectively displayed. A card gives details of the economy of gas for heating, cooking, and other domestic uses as compared with electricity, oil, and spirit.

In addition to the publications of the Central Organization (a few of which have been noticed in the foregoing) a number of the German makers of gas lighting, heating, and cooking appliances issue leaflets and circulars which show by way of question and answer, or by way of short sketches, the advantages that gas possesses for public lighting and domestic uses. These publications give valuable support to the Central Publicity Organization, which is doing most useful propaganda work in Germany.

* "Illustrirte Zeitung," No. 3600, Vol. 138. Technische Kulturbilder 1, Das Gas. Price of the special issue, 2 marks. J. J. Weber, Leipzig.

"NICO" BURNER IMPROVEMENTS.

EVER since the New Inverted Incandescent Gas-Lamp Company entered into business, "Progress" has been their motto. There has never been any standing still either technically or commercially. The technical progress has been the foundation of the commercial progress; and now, as for some years past, the term "Nico" denotes something more than a mere trade term. It is regarded as the hall-mark of quality and efficiency. Looking round the Company's show-rooms on the approach of the lighting season, the visitor had pointed out to him various improvements which have been introduced between the lighting seasons, and which experience has suggested. It is in the amalgamation of improvement in detail that real advance in the efficiency and service of any appliance—whether a gas-burner or otherwise—is made; and improvement of this nature is found in the "Nico" burners, lamps, mantles, and fittings of all descriptions, whether for domestic lighting, for the illumination of business establishments, factories, or other large interiors, or streets. And besides improvement, there is that ever-increasing range of burners and lamps which adds to the armour of the gas salesman.

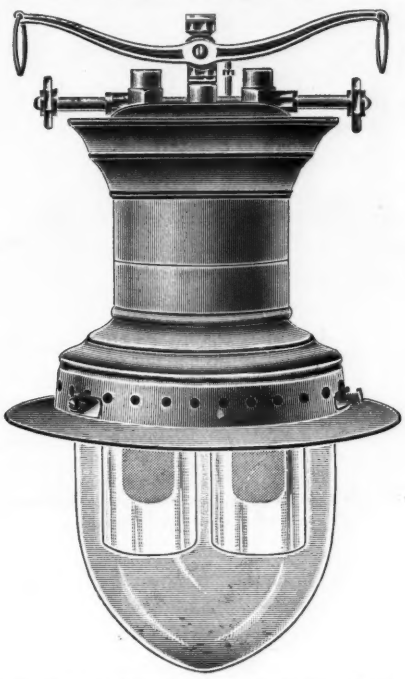
At the moment, there does not seem much chance of making any serious advance on the design of the ordinary or domestic types of "Nico" burners; but a difficulty has been overcome in all the various forms of the burners that bear this designation.

The Improved "Nico" Burner.

"Nico" Indoor High-Power Low-Pressure Lamp (Single Burner).

It is the attachment of an arm with insulated head to the air-collar of the burners, so that adjustment of the primary air supply can be made at any time in addition to the gas-regulation. Before this provision was made, it was found troublesome, after a burner had been in use a short time, to adjust the air-shutter without incurring personal inconvenience. It can be readily done now. Then other structural changes have been made, with a view to raising the efficiency of the burners. These are improvements that are not visible to the eye as improvements, except through the indications given by the illuminating performances of the burner. Certain changes have been made in the construction of the bunsen tubes and other parts, the result being a strong and highly efficient burner. But notwithstanding, no alteration is being made in the price. Selecting one burner for special notice—the No. 9 form. This is called the "Popular"—"a popular burner at a popular price." This is made in the standard large size; and its duty is placed at approximately 80 candles per 3 cubic feet of gas consumed per hour. There is no question about it, the gas consumers of to-day, by the spread of information, are being educated up to the employment of higher efficiency burners. Take just as an example, without disregard of the other gas consumers, the prepayment meter customers. It was difficult at one time to find anything but flat-flame burners in their houses; then vertical incandescent burners began to creep into their rooms; and now one can pass through many thoroughfares in which the dwellings of working men are situated, and note, through the partially drawn blinds, the inverted burner in use. We are satisfied, even if the electrician with his 16 and 8 candle power lamps for the working man is not, that the latter has learnt, and is still learning, to appreciate the economy of purchasing a good durable burner that reduces consumption, and gives him an eight-fold increase on flat-flame burners in illumination. The "Popular" burner meets the views not only of people with a small spending capacity and requiring good value for money, but of those who need for shop lighting and other purposes a durable burner. The "Popular" is fitted with all the latest improvements, and is well finished. No reference to the other types of indoor burners is called for, beyond saying that the advances found in one are incorporated in all.

Before passing to the high-power lamps, it is found that the Company are this season running two distinct qualities of mantles. The standard "Nico" mantles are henceforth being made of a special ribbed fabric, and are loom-woven throughout. The ribs assist in strengthening the mantles; and the fabric is highly impregnated. These mantles, the Company inform us, give a higher illuminating power than those of the ordinary knitted type; but, good results notwithstanding in regard to durability and illuminating power, the prices are to remain the same as those of last season's quality. There is competition to be thought of, and the demand for a lower priced article; and so the Company are also supplying knitted mantles of the finest ramie—these being recommended for maintenance work where price is a consideration.



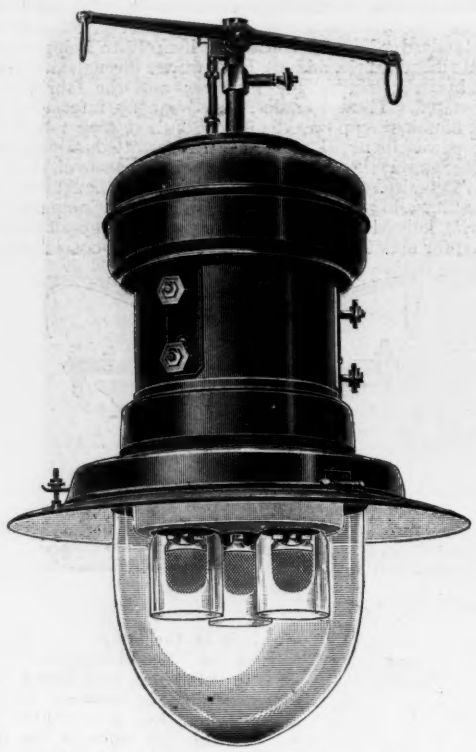
"Nico" Indoor High-Power Low-Pressure Lamp (Two Burners).

Now we come to the "Nico" high-power, low-pressure indoor shop lamps (of the 1912-13 type)—the applications of which extend to other fields of lighting than shop illumination where single high-power light sources are required. These lamps (which, in their white enamelled, gold-lined casings, are of good appearance) are made in two sizes—250-candle power (single burner), and 500-candle power (double burner); the consumption per burner being about 7 cubic feet—varying up or down according to gas quality and pressure. The price of these lamps for business development is as attractive as their appearance; and for the price a large amount of work and metal has been put into them, but they are anything but heavy in appearance. In detail, the construction is much the same as in the high-power, low-pressure lamp for outside lighting.

In the outside high-power lamps (which sprang into immediate favour last lighting season), some important improvements have been made. For example, each burner is now under separate control in relation to the gas supply. This is a convenience, the product of experience. There have been consumers who have complained that, in the event of a mantle getting broken during lighting hours, there have been no means in the multiple-burner lamps of turning off the gas supply to the burner placed *hors de combat;* and this has meant entirely extinguishing a lamp to replace the defective mantle. Now the flow of gas to any burner can be completely arrested by the gas-regulator of the burner; and in addition to this regulator, one is also fitted at the top of the lamp for adjusting the pressure. Another improvement has been made in the lamp by fitting it with three cast-iron heat-resisting plates—two at the bottom of the head of the lamp, and one at the top; and these are found very efficient in protecting the inner parts of the lamp. The lamp is now supplied in four sizes, containing one, two, three, or four burners—ascending, by 250-candle power stages, from that candle power for the single burner lamp to 1000-candle power for the four-burner lamp. The improvements in these lamps have made no difference to the prices.

The range of shop lamps is a considerable one. There is another pattern for outside use that is already very popular. It is the "Nico-Simplex" lamp. The title indicates a simple construction; and yet an efficiency is obtainable of approximately 110 candles per burner per 4 cubic feet of gas per hour. There are no inner cylinders to this type; and it is neat and well made. The principal object of this production is for hire-purchase and maintenance purposes. The "Nico-Radio" gas-lamp has been favoured with so much patronage for outside lighting work that the Company have been able to materially reduce the price; so that there will be no slackening of demand for this pattern.

The Company have issued an excellent new catalogue of 136



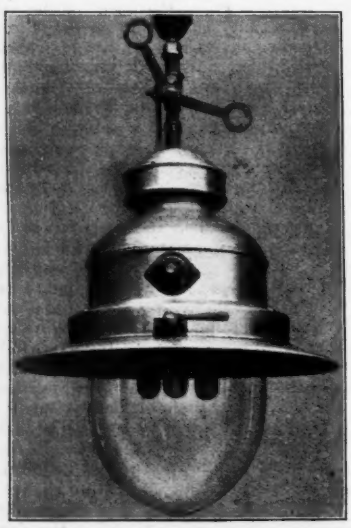
"Nico" Outside High-Power Low-Pressure Lamp. Improved (1912-13) Pattern.

pages. It contains such a range of exact illustrations of all kinds of fittings and glassware of new designs and for all purposes, that it constitutes a handy companion for every gas office and showroom. In glancing through it, many new patterns of fittings and of glassware meet the eye—from plain to highly ornate production, and at prices that will satisfy the pockets of all classes of purchaser. We need not specify any particular types that take our fancy. Fancies vary; and the catalogue is available to all in the gas industry who require one.

A FRESH ADVANCE IN GAS-LAMP CONSTRUCTION

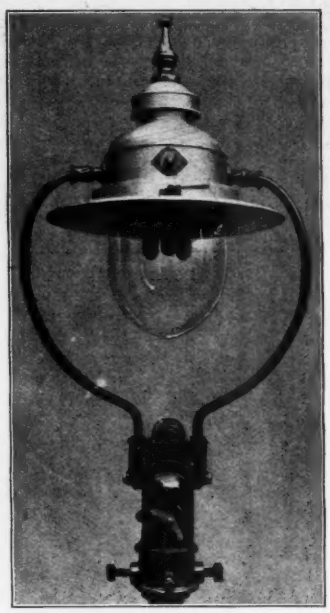
In the "Dacolight" Series.

THERE is perhaps to-day no branch of illuminating engineering that is so fascinating as the design and construction of high-power gas-lamps. Many minds have been directed to the problems of snatching from the store of potentiality that gas offers some fresh degree of efficiency beyond that already attained and mastered as a constant reproducible quantity. Most inventors have, in this work, had their eyes fixed on the realization of a greater lighting efficiency in relation to the consumption of gas—that is to say, the realization of a greater duty per cubic foot of gas consumed. But that is not the only efficiency that is requisite in any form of gas-lamp, and especially in those that are used for public purposes in streets and other places. There is what, for the sake of a better term, and to distinguish it from lighting efficiency, we will call the "working efficiency." A lamp situated out-of-doors is exposed to a variety of conditions — irrespective of variations in composition, specific gravity, and pressure of gas supply in different districts—of atmospheric and temperature origin that may, and do with some lamps, affect working efficiency and produce trouble. A lamp may be a highly efficient one in regard to illuminating power when tuned up to its best, and working under normal conditions; but any one change in condition, or any abnormal circumstance, may have a vexing effect upon its working efficiency. Experience throws a large amount of light on these matters; but the problems of how to master them are the difficulties, and oftentimes they can only be made to succumb to long research and experiment. It is not our business to discriminate between lamps that have and have not secured both a high illuminating efficiency and a high working efficiency, which latter means a lower cost in the matters of maintenance, wear and tear, and labour. Gas supplies are so varied in the districts of different gas undertakings and the conditions of use are so divergent, that a lamp that may not give a good working account of itself in one area may do so in another.



The New "Dacolight" Lamp for Suspension.

We have had an opportunity of investigating a series of new lamps which, we firmly believe, experience will prove has the right to be pronounced an advance in gas-lamp construction. This new series will come under the well-known trade term of "Dacolight," with which trade term the name of Messrs. Anderson, of No. 20, Farringdon Road, E.C., is associated. The problem that Mr. Anderson personally set himself to solve was how to increase working efficiency without impairing lighting efficiency; and he came to the conclusion that the means of securing a high lighting efficiency in outside low-pressure lamps must be revised in order to obtain a high working efficiency. That is what he has accomplished, and, with a few subsidiary improvements, has brought to the market a series of lamps of both high illuminating and working efficiency which can be constructed in units ranging from 40 candle power up to 3000 candle power, depending upon the number of nozzles fitted in any lamp. The improvements that these lamps contain enable the firm to construct outdoor lamps to suit any set of circumstances, and give them perfect liberty to construct any combination required in any lamp.



The New "Dacolight" Lamp for Street Lighting.

Let us, in the first place, point out broadly what the new improvements (which are the subject-matter of patents) have enabled the firm to do:

(1) They have produced a lamp which, working at ordinary district pressures—pressures as low as will be found in any badly served district in that respect—will give a high efficiency, and a good account of itself for constancy in behaviour.

(2) By changing one part only of the burner, altering the nipple, and using a smaller number of larger nozzles, the lamp can be converted into a low-pressure high-power one.

(3) By making one other change in the same part of the burner, and altering the nipple and the nozzles, the lamp can be converted for high-pressure work.

The structural parts of the lamp are made of such strength that the change from one form of lamp to the other can be effected promptly and inexpensively. But there the advantages of the lamp have not ended. There are others:

(4) By the disconnection of two or three small parts and a nut, the whole of the structural parts of the lamp can be taken apart; and every part, being pressed and concentric, can be expeditiously renewed at any time.

(5) Improvements, too, have been made which enable the cleaning of the burner nipple by the mere pressure outside the lamp of a spring-controlled cleaner; and there is, by drawing out the plug carrying the gas-nipple, a free way through the burner from gas inlet to nozzle outlet.

(6) An improvement has been effected by which the globes are saved from a premature end other than by accident or violence, and coincidently this improvement gives a new course to the admission and flow of the air supply.

These points, which, so far, are only stated in general terms, show the lines on which progress has been made (apart from lighting efficiency) in working efficiency, in imparting to the lamps a large range of variability of application, in contributing to the economy of maintenance, and in raising the level of constancy in performance.

On this last point, we must go back a little. The chief achievement in the new type of lamp is found in the burner itself; and

The "Dacolight" Lamps in the Earl's Court Road.

the burner, while giving a high efficiency per cubic foot of gas consumed per hour, is chiefly responsible for the higher plane of working efficiency. We are sorry that, owing to the formalities connected with the patents, we cannot for the moment describe in detail the new burner; but it is the result of two or three years of close study and much money expenditure in experimental work on the part of Mr. Anderson. The difficulty it was desired to overcome was this: In lamps having one big mixing chamber and a number of nozzles fed direct therefrom (we are speaking, of course, of inverted mantle lamps), there have been three ways of lighting with the view to preventing back-ignition—one has been the provision of mechanism for temporarily shutting off the air supply and lighting the lamp by gas only; the second has been by the use of such expedients as a thermostat, under which system a small quantity of gas is at first allowed to pass through to the nozzles, and then, as the lamp heats up, the thermostat opens the gas-way; and the third is by first flushing gas through the burner. In the preceding series of "Dacolight" lamps, a cast-iron box formed part of the burner. By its means and the use of two pipes, when the gas was first turned on, there was a big flush of gas (giving a large proportion of gas to air) allowed to go through the box; and in this way the lamps were, by the aid of a bye-pass, lit up, and then, by turning the main lamp cock, things were brought to normal condition. But even in this lamp, with the flush, and the one large mixing chamber feeding a number of burners, there was the danger and occasional trouble of lighting-back. Thus it is that in most makes of lamps with large mixing-chambers, the use of gauze is an imperative necessity; and thus it is, too, that many makers prefer, instead of one mixing chamber, to use several independent burners, which, however, necessitate independent adjustment to secure uniformity of result at the mantles.

In the new burner, no gauze is used. The down-tube of the burner is so constructed that it accelerates the flow of the mixture. The gas is delivered into what for the moment we will describe as the "box" of the burner, which in each lamp is proportioned, with mathematical accuracy, to the number of nozzles that are to be attached to its underside, and which underside is heated by the bunsen flames within the mantles. Increased velocity, a superheated mixture, and a thorough admixture, without (however the burners are lighted) lighting-back—as was demonstrated by several experiments in our presence—are the effects secured by the construction of the burner, which will be more particularly described on a future occasion. Furthermore, it is a noiseless burner. It lights up by a single flash-jet without noise, it works without noise, and when extinguished there is no noise. This is the burner that constitutes a technical advance for low-pressure lighting, contributes to working as well as illuminating efficiency, and is simply convertible with the lamp as it stands (Mr. Anderson informs us) for high-pressure work. Moreover, the heat absorbed by the bottom of the box, while it superheats the gas and air mixture, is also partly deflected on to the suspended mantles below. The efficiency of the lamp in heat utilization is therefore great. It may be taken that the average consumption of gas per hour is 13·8 cubic feet for a four-nozzle burner, including bye-pass; and the illuminating efficiency is high. Any exact photometrical tests have not yet been made; but inspection leaves no room for doubt that, when photometrical tests are carried out, the measured efficiency will confirm the excellence of the efficiency that visual examination already places on the lamp. There is a wonderfully large body of soft light; and though more mantles are required than for a single burner giving a high candle power from the one mantle, it is claimed by Mr. Anderson that, the aggregate mantle area in the lamp being so much greater for a given illuminating power, the intrinsic brilliancy of the source of the light is reduced to a bearable degree within the field of vision at the heights at which the lamps are located.

Another point is the air supply to the lamp; and this bears upon the question of globe breakage. This is a matter that Mr. Anderson has been assiduously investigating; and, by experiment, he has arrived at the conclusion that the ordinary manner of suspending the globes, and subjecting them to considerable extremes of temperature, is responsible for much of the trouble from globe breakage. It is often found that globes are suspended direct by the lip resting all round on its metal support; the result being that the globe is subjected to extreme inequalities in heating. In the new lamps, the lip of the globe is raised above the rim of the support, and the globe is held in position at only two or three points by saddle-back projections. The small annular space provided by this suspension of the lip of the globe above the metal ring support forms the air-inlet for both primary and secondary air. Part of it travels up past the reflector (which is so curved as to give a good distribution of the light) to the head of the lamp; and so reaches the primary air inlets of the burner, while the air required for combustion at the nozzles travels down into the globe, and so to the burner. In both courses the air gets heated before reaching the point of use. The passing of the cold air over the critical point of globe suspension assists to keep the globe from suffering from extreme temperatures, and so obviates the troublesome results that are both annoying and expensive, and therefore promotes maintenance economy. No inner glasses are used. The ring support for the globe is hinged, and is held in position by a catch worked by a small handle; and, until this small handle has completed the full length of its travel, the catch is not released. The device prevents the rapid opening of the lamp by careless lamp attendants, which rapid opening again is a somewhat frequent cause of globe destruction.

The whole regulation of the lamp—both air and gas—can be accomplished from outside; and the spring cleaner for the gas-nipple is also externally operated. The entire head of the lamp is built up, as already said, of concentric parts, carried by the central supply-pipe. One has only to remove the nipple cleaner, unscrew the regulator, draw out the plug carrying the gas-nipple, and one can then blow through the whole burner. By removing a nut put at the top of the lamp, all the concentric parts, including the radiator head, can be taken apart. What this all means from the maintenance point of view needs no explanation; it is obvious that it is important. Indeed, under this system of lamp construction, the large outdoor units can be as easily dealt with as the smaller ones for factories and other interiors.

We give two new photographic illustrations of the lamps, as well as a photograph of "Dacolight" lamps in use in Earl's Court Road. There are about 45 lamps installed there; and these gained the position in competition. These particular lamps contain the old form of burner; and an interesting point about them is the method of lighting. No flash-light is kept going in these lamps. There is torch lighting, but the torch is not admitted to the lamps. At the head of each lamp is a lighting-tube with a flap-door on the outer end. Inside the lamp near the opposite end of the lighting-tube is a simple, right-angled duplex burner—the one jet impinging on the interior end of the lighting-tube, while the other throws an elongated jet downwards to light up the flash-jet below. The application of the torch to the flap of the lighting-tube partly turns on the gas. The gas issuing from the jet by the interior part of the lighting-tube is ignited, and this, impinging on the end of the tube, doubles-back, and ignites the downward jet of gas, which in turn ignites the flash-jet, and this the flush of gas through the burner-box, as already described. The application of the torch to the lamp-cock does the rest; and the lamp is in working order.

Mr. Anderson is congratulated on his success in achieving an advance in lamp development, the central feature of which is the non-lighting-back burner and mixture superheater.

BRITISH COMMERCIAL GAS ASSOCIATION.

Programme of the First Annual General Meeting.

THE following is the complete programme of the first annual general meeting and conference to be held (through the courtesy of the Lord Mayor and Corporation of Manchester) in the Town Hall, Manchester, under the presidency of Mr. CORBET WOODALL, J.P., M.Inst.C.E., on Tuesday and Wednesday, Oct. 8 and 9.

TUESDAY, OCT. 8.

11 a.m.—In the Lord Mayor's Parlour, Manchester Town Hall.

Reception of Members, International Members, Associate Members, and Visitors by the Right Hon. Samuel Walter Royse, J.P., Lord Mayor of Manchester.

Addresses of Welcome by Councillor William Kay, J.P., Chairman of the Manchester Corporation Gas Committee; and Alderman F. S. Phillips, J.P., Chairman of the Salford Corporation Gas Committee.

Address by the PRESIDENT.

Presentation of the First Annual Report of the General Committee, and a Statement of Accounts up to Sept. 30, 1912.

(*Adjournment at* 1.20 *p.m.*)

1.30 p.m.—Luncheon to the Association by the Chairman, Vice-Chairman, and Members of the Manchester Corporation Gas Committee, in the Banqueting Chamber at the Town Hall.

3 p.m.—Discussion on the Annual Report and Accounts.

Reading and Discussion of Paper on "The Aims and Claims of the "B.C.G.A.," by Mr. H. JAMES YATES, F.C.S., M.I.Mech.E.

(*Adjournment at* 5.30 *p.m.*)

7 p.m.—First Annual Dinner of the Association, at the Midland Hotel.

Reception by the President at 6.30 p.m., to meet the Right Honourable the Lord Mayor, the Deputy-Mayor, and Members of the Corporation of Manchester, and the Mayor, Deputy-Mayor, and Members of the Corporation of Salford.

8 p.m.—Reception by the Editor of the Association (Mrs. M. A. Cloudesley Brereton), to meet the Lady Mayoress of Manchester and the Mayoress of Salford. [For lady members of the Corporation and of educational and sanitary authorities, and other ladies invited to the Lecture by Professor Lewes.]

9 p.m.—A Lecture, at the Midland Hotel, by Professor VIVIAN B. LEWES, F.C.S., F.I.C., on "The Hygienic Aspects of Gas for Heating and Lighting in Home, School, and Workshop."

WEDNESDAY, OCT. 9.

9.45 a.m.—Assembly at the Manchester Town Hall.

10 a.m.—Reading and Discussion of the following Papers:—

"Show-Rooms in Relation to Gas Supply," by Mr. GEORGE CLARRY, F.C.I.S. (Cardiff).

"The Development of Coke Sales," by Mr. J. FERGUSON BELL, M.Inst.C.E. (Derby).

"A Campaign amongst the Doctors," by Mr. H. H. CREASEY (London).

Decision as to place of Meeting in 1913.

General Business.

(*Adjournment at* 1.40 *p.m. Tramcars will be in waiting to convey Members to Peel Park, Salford.*)

2 p.m.—Luncheon to the Association by the Chairman, Vice-Chairman, and Members of the Salford Corporation Gas Committee, at the Royal Museum and Libraries, Peel Park, Salford.

4 p.m.—Address on "The Science of Salesmanship," by Mr. A. F. SHELDON (founder of the Sheldon School of Business Building), in the Royal Technical Institute, Peel Park, Salford.

THE COALS OF NOVA SCOTIA.

IN view of suggested importations of Nova Scotia coal into this country for gas-making purposes, the following information has been compiled from official mining sources for the current year.

All the coal mined in this province of Canada is bituminous in quality; and the following subdivision into fields of the coal areas is the one usually adopted: (1) Sydney, (2) Inverness, (3) Richmond, (4) Pictou, and (5) Cumberland.

The Sydney field is situated in the north-eastern corner of Cape Breton County, with the harbour of Sydney as its central point, and taking in a small portion of Victoria County. The land areas amount to 200 square miles; but a great part of the local field is submarine, the extent of which latter is unknown. The aggregate thickness of coal in workable seams, outcropping on the shore, and for the most part exposed in the bays and cliffs, is from 40 to 50 feet. The seams vary from 3 to 9 feet in thickness. The Sydney mines have extensive workings under the sea; and the Dominion Coal Company are actively developing a submarine area at the Hub Mine, near Glace Bay.

Mr. Hugh Fletcher, in a descriptive note on the Sydney coal-field, says: "The coal is of the bituminous or 'soft' variety, with comparatively little diversity in the quality of the different seams, all of which yield a fuel exceedingly well adapted for general purposes; while that of some of them is specially well applicable to the manufacture of gas. As compared with the Pictou coal, it is characterized, on the whole, by a greater proportion of combustible matter, and a smaller proportion of ash. But, on the other hand, it usually contains a greater amount of sulphur," only a portion of which can be removed by washing. Notwithstanding this fact, it is largely used for metallurgical purposes.

A section of the Sydney mines, with the name and thickness of the seams of coal and intervening strata, is as follows:—

Cranberry Head	3 ft. 8 in.	W. Fraser	1 ft. 8 in.
Strata.	281 feet	Strata.	97 feet
Lloyd Cove	7 ft. 2 in.	Indian Cove	5 feet
Strata.	250 feet	Strata.	94 feet
Seam B.	4 ft. 2 in.	Seam F.	2 ft. 2 in.
Strata.	352 feet	Strata.	112 feet
Sydney Main	3 to 6 feet	Stony	4 feet
Strata.	260 feet		

Most of the Sydney coals are well suited for the manufacture of gas, as the figures in the table below show.

TABLE I.—*Showing the Suitability of Sydney Coals for Gas Manufacture.*

Name of Mines.	Gas in Cubic Feet per Ton of Coal.	Candle Power of Gas.	Coke Produced per Ton of Coal.
Little Glace Bay	9,268	15	40 bushels
" " "	9,700	14·75	39 "
International	10,000	16	1470 lbs.
Sydney	8,200	8	1295 "
Gowrie	9,000	15	1230 "
Caledonia	8,900	14·25	36 bushels
Reserve	9,950	13·17	1500 lbs.

Table No. II. (p. 819) has been compiled from the records of tests of coal before and after washing. It will be noted that in many samples the sulphur content is high, and is not sensibly diminished by washing the coal; and a somewhat similar comment is applicable to the ash contents. In most cases the samples were taken by an official of the Canadian Department of Mines; and the tests were carried out upon a uniform plan. Those given in the table are a selection in which the details are the most complete. The samples were from the several collieries and seams of coal owned as follows:—

Nos. 1 & 2.—Dominion Coal Company, Limited, Glace Bay, N.S.
No. 3.—Nova Scotia Steel and Coal Company, Limited, Sydney Mines, N.S.
" 4.—Inverness Railway and Coal Company, N.S.
" 5.—Richmond Railway Coal Company, Limited, Port Hood, N.S.
" 6.—Acadia Coal Company, Limited, New Glasgow, N.S.
" 7.— " " " " Stellarton, N.S.
" 8.—Intercolonial Coal Mining Company, Westville, N.S.
Nos. 9 & 10.—Cumberland Railway and Coal Company, Limited, Springhill, N.S.
No. 11.—Maritime Coal, Railway, and Power Company, Limited, N.S.
" 12.—Minudie Colliery Company, Limited, River Hebert, N.S.
" 13.—Canada Coals and Railway Company, Limited, Joggins, N.S.
" 14.—G. H. King, Minto, New Brunswick.

To the results contained in the table have been added lines 15 to 17, to show the improvement in quality due to washing the coal—a consideration of importance where freight charges are likely to be a large fraction of the price of the coal.

Westminster Technical Institute Gas Engineering Classes.

There has been forwarded to us by Mr. J. Stuart Ker, B.Sc., the Principal of the Westminster Technical Institute, Vincent Square, S.W., a copy of the prospectus and time-table for the session 1912-13. Among others, this gives some particulars of the evening classes in civil and gas engineering and heating and ventilation. The gas engineering classes are as follows: Technical Calculations (Tuesday), Mr. F. G. Steed and Mr. H. H. Jacques; Technical Drawing (Tuesday), Mr. F. G. Steed and Mr. H. H. Jacques; Gas Supply—I. (Monday, Wednesday, and Thursday), Mr. P. Smithers, assisted by Messrs. D. Williams, J. Bevis, H. S. Tutton, and T. Coghill; Gas Supply—II., *a* (Wednesday), Mr. J. G. Clark and Mr. D. J. Winslow; Gas Supply—II., *b* (Thursday), Mr. J. G. Clark and Mr. D. J. Winslow; and Gas Manufacture (Thursday), Mr. Arthur Valon. Classes for gas-fitter apprentices, by arrangement with the Gaslight and Coke Company, are given by Mr. Steed, Mr. Jacques, and Mr. Osborn; and the London and Southern District Junior Gas Association meet in the Institute. The lectures will be experimentally illustrated by gas appliances of the most recent type, and a workshop and laboratories have been equipped for practical and experimental work. An experimental gas engine and compressors have been installed. The classes began yesterday.

Livesey Professorship of Coal Gas and Fuel Industries.—The Council of the University of Leeds, at a meeting last Wednesday, appointed Mr. H. J. Hodsman, M.Sc. (Leeds), to be Assistant Lecturer and Demonstrator under the Livesey Professor of Coal Gas and Fuel Industries.

TABLE II.—*Giving the Proximate Analysis of Nova Scotian Coals, before and after Washing.*

Name of colliery, Name of seam of coal, Distinguishing No. in this table.	How Results of Tests are Expressed.	Sydney Coalfield, Cape Breton County, Nova Scotia.			Inverness Field and County.		Pictou Coalfield and County.			Springhill Coalfield.		Joggins-Chignecto Field.			Grand Lake Coalfield, Queen's County.
		Dominion No. 7. Hub. 1	Dominion No. 10. Emery. 2	No 1. — 3	Inverness. — 4	Port Hood — 5	Vale. Six-foot. 6	Albion. Third. 7	Drummond. Main. 8	No. 2. — 9	No. 3. — 10	Chignecto. — 11	Minudie. — 12	Joggins. — 13	King's. — 14
1. Moisture in the check sample sealed at mine	Per Cent.	3·5	4·0	3·5	9·3	4·7	2·1	—	1·4	2·8	2·8	3·6	3·8	1·3	1·3
2. Volatile matter in main sample after drying	,, ,,	36·5	35·1	37·4	40·0	37·1	32·1	29·8	24·7	32·3	33·5	41·0	35·7	36·6	32·2
3. Fixed carbon ,, ,, ,,	,, ,,	57·6	53·8	55·4	49·6	48·3	50·6	55·5	60·8	58·5	55·0	45·7	48·8	44·8	53·4
4. Ash ,, ,, ,, ,,	,, ,,	5·9	11·1	7·2	10·4	14·6	17·3	14·7	14·5	9·2	11·5	13·3	15·5	18·6	14·4
5. Sulphur ,, ,, ,, ,,	,, ,,	2·4	2·5	2·9	6·0	7·9	1·0	1·4	2·5	1·6	1·8	6·4	6·7	5·4	5·8
6. Calorific value of ,, ,, ,,	Calories	7700	7290	7650	6750	6540	6680	6990	7200	7430	8160	6750	6570	6440	7160
7. ,, ,, calculated to ash free dry coal	,,	8180	8200	8250	7530	7660	8080	8200	8420	8180		7790	7780	7910	8360
Proximate analysis, &c., of combined product of large scale washing tests.															
8. Volatile matter in washed coal after drying	Per Cent.	38·2	36·9	40·2	42·5	37·9	33·2	30·8	25·3	33·1	34·7	41·3	37·3	38·1	34·0
9. Fixed carbon ,, ,, ,,	,, ,,	59·1	57·3	56·3	51·0	51·2	54·2	56·9	63·4	59·8	57·0	49·6	51·7	51·6	56·6
10. Ash ,, ,, ,, ,,	,, ,,	2·7	5·8	3·5	6·5	10·9	12·6	12·3	11·3	7·1	8·3	9·1	11·0	10·3	9·4
11. Sulphur ,, ,, ,, ,,	,, ,,	2·0	2·1	1·9	5·0	6·7	1·0	1·3	1·3	1·4	1·5	6·2	6·3	4·8	4·9
12. Calorific value of ,, ,, ,,	Calories	7950	7710	8050	7110	6970	7090	7530	7530	7700	7540	7160	7000	7080	7680
13. ,, ,, calculated to ash free, dry, washed coal	,,	8170	8190	8340	7610	7820	8110	8270	8490	8290	8220	7880	7870	7890	8480
14. Ash in refuse from coal washing, after drying	Per Cent.	54	47	43·5	34·4	26·8	58·3	33·1	36·0	31·5	45·0	31·0	49·5	46·0	38·8
15. Improvement in ash, by washing line 4 minus line 10	Per Cent.	3·2	5·3	3·7	3·9	3·7	4·7	2·4	3·2	2·1	3·2	4·2	4·5	8·3	5·0
16. ,, ,, sulphur, line 5 minus line 11	,, ,,	0·4	0·4	1·0	1·0	1·2	0·0	0·4	1·2	0·2	0·3	0·2	0·4	0·6	0·9
17. ,, ,, calorific value, line 12 minus line 6	Calories	250	420	400	360	430	410	260	330	270	320	410	430	640	520

THE CHOICE OF REFRACTORY MATERIALS.

By "ALMEA."

THE comprehensive reports drawn up by the Refractory Materials Committee of the Institution of Gas Engineers, and which are periodically published in the pages of the "JOURNAL," leave very little to be said on this most important and, at the same time, very abstruse subject. Before the formation of the Committee named, the question of suitable high-temperature resisting material received very little attention; and it is, therefore, not surprising to find that comparatively few users of fire-clay really understand its properties and correct application to the various conditions prevailing on a gas-works. More often than not, the prospective purchaser will employ such-and-such a material because practical experience has shown it to be reliable, or, maybe, his mind is made up for him by the volubility of a particularly persuasive traveller, anxious to find a market for his goods. Under the circumstances, then, the writer feels that there is some room, perhaps, for an article dealing with the question from a more or less elementary point of view; and those who wish to follow the matter further should refer to the reports of the Refractory Materials Committee, the latest of which is to be found in the "JOURNAL" for June 15.

With regard to the "practical-experience" test, there is little doubt that this is the most reliable, if somewhat expensive, way of ascertaining the value of a particular material. But, undoubtedly, a good deal of trouble and expense might be avoided if, in the first instance, the question was studied from a scientific point of view. For instance, the conditions likely to be prevalent under some particular circumstances should be subjected to a dissection on lines such as the following:—

1. Is the temperature high or moderate? "Moderate" may be considered up to 1800° Fahr.; "High," up to 2500°.
2. Will there be fluctuations of temperature?
3. Will the material come into direct contact with the flame?
4. Will there be a "cutting heat?"
5. Is the material likely to come into contact with the flue-dust, which may set up a "fluxing" action; or will it be affected in the same way by the slagging action of the coke or clinker?
6. Is mechanical strength required—*i.e.*, does the material have to bear any great weight in addition to heat?
7. Is heat to be conducted or retained?
8. Will the material be affected differently if subjected to an "oxidizing" or a "reducing" flame?

CONDITIONS IN A RETORT-SETTING.

Take, for instance, an ordinary retort-bench, and consider, first of all, the retorts themselves. Not only do they have to withstand high heats, but in addition, as discharging and charging takes place, they are exposed to considerable fluctuations in temperature. Moreover, they must be of a certain mechanical strength, in order to carry the loads to which they are subjected and to resist the strains put upon them by the stoking machinery. In the case of the full coal charge and "pusher," the retort has to withstand a considerable bursting pressure in the event of a charge jamming-up and refusing to move.

Now, for high temperature, a highly-refractory material is required; and to obtain this, high porosity and a fairly open grain are essential. For mechanical strength, on the other hand, a close-grained material, of high density, gives the best results. Moreover, the latter will be more efficient from the point of view of thermal conductivity. In the manufacture of the retort, therefore, these two contrary requirements have to be reconciled, although greater attention is usually paid to the former.

COMBUSTION CHAMBER.

Taking the combustion chamber, we have now to obtain a material which will resist the greatest heat produced in the setting. It is a well-known fact, of course, that the greater the percentage of silica in the material, the greater will be the refractoriness. Ordinary fire-bricks manufactured from Stourbridge clay contain, on an average, from 65 to 75 per cent. of silica; whereas bricks produced from material such as Dinas clay, which occurs in South Wales, contain as much as 97 per cent. These highly silicious clays make an admirable material for resistance to high heats; for the high proportion of silica is accompanied by a very low percentage of impurities—these amounting to only about 1½ per cent. It is hardly necessary to point out that the impurities—and especially the iron salts—have a comparatively low fusing point; and when once they have started to "run," they act as a flux to the remainder of the material, and are likely to reduce the whole to a state of fusion. In the manufacture of ordinary bricks, this property is made use of to bind the material together. In this case, however, the proportion of impurities is high, and the silica does not usually exceed 50 per cent. The bricks made from Ewell sand also provide an excellent material for use in the combustion arch, and contain about 87 to 89 per cent. of silica. It is stated, moreover, that they do not expand when subjected to heat.

A fact which is sometimes overlooked is that of the contraction of ordinary less silicious fire-bricks under the influence of heat; whereas the highly silicious bricks expand. Only recently, the writer was discussing the subject with an engineer who has made use of these properties to equalize the effects of the heat; the

retort-setting being constructed so that the contraction of the fire-bricks is counteracted by expansion of the silica bricks. When the same material is used throughout the setting, the tendency is for the retorts to lose their level, and to tilt slightly, owing to the shrinkage of the brickwork. The effect of the expansion is, however, to maintain everything on an "even keel."

The materials forming the combustion chamber usually suffer under the action of a "cutting heat," which is difficult to avoid at this particular spot. As ideas as to the precise meaning of a "cutting heat" vary somewhat considerably, it may be explained that it is usually understood to be the effect of a hot flame playing on some particular spot; this action of the furnace gases (which are highly charged with iron dust) being the most trying which the material is called upon to withstand. In addition to the extreme heat of the flame, there is the presence of the flue dust—containing about 50 per cent. of iron—which tends to set up the fluxing action already referred to.

Division Walls.

With regard to the work above the combustion arches—*i.e.*, the division walls of the setting—mechanical strength is required here rather than high refractoriness, for the material is not likely to be subjected to a "cutting heat," but merely comes in contact with the circulating gases. Thus a brick of greater density and less porosity may be used, and ordinary Stourbridge fire-bricks, of the best quality, answer very well. Some designers prefer to carry up the Ewells or other highly silicious bricks to the top of the setting in the centre, and to use the less silicious bricks for the outsides of these walls. In other cases, the refractory bricks are carried up (say) to half the height, and the wall is then completed with the fire-bricks.

Mr. F. J. Bywater, in his well-known paper treating of refractory materials, says: "Care should be taken that the bricks used in the cross walls higher up in the setting are of sufficient refractoriness to withstand the working temperature, as drippings resulting from the fusion or partial fusion of these often cause trouble. . . . High-class fire-bricks of the Glenboig, Ganister, Stourbridge, or Yorkshire, and Derbyshire biscuit silica are quite suitable and desirable." Referring to dripping, the writer has in mind the case of a setting, subjected to a severe "cutting heat," in which some of the secondary air channels were partially choked by the fused material.

Producers and Regenerators.

It is a "Golden Rule" of the retort-house that the furnaces must not be too hot; and so far as the producer lining is concerned there is theoretically no need for very high refractoriness. If, however, an inferior brick was made use of, the results would undoubtedly be very far from pleasing, for the heat in the producer—chiefly owing to the fluctuating depth of coke—undergoes severe changes. Moreover, the effect of the slagging action of the clinker has also to be contended with.

With regard to the construction of the regenerating flues for the secondary air, it must be borne in mind that the arrangement is employed with a view to abstracting the heat from the waste gases and conducting it to the secondary air. Thus, in this case, as the heat is comparatively small, the bricks should be made with an eye to high thermal conductivity rather than to high refractoriness. In this way, the maximum amount of heat would be extracted from the waste gases before they leave the setting.

Outside Walls.

There now only remain the outside walls to be dealt with; and on all gas-works it has so far been customary to set these up in ordinary fire-brick work, although recently the practice is extending of interposing a lining of some non-conducting material. Here, of course, the object is to retain as much heat as possible inside the setting. Thus a brick with a low heat conductivity is required; and hence the porosity should be high. Within the last few months there have come into the market special brands of featherweight (and, therefore, highly porous) bricks, which are designed for the purpose of insulating the settings; and a wall of these is usually built up immediately inside the outermost wall. When this practice is followed, the writer sees no reason why the outside wall should not be built of ordinary stock-bricks which would act as a further insulation, owing to their porosity.

Referring to porosity, it should have been explained that this can be regulated (within certain limits) by the manufacturer, and is chiefly dependent upon the amount of "grog" added to the clay. "Grog" or "chamotte" is a works term for the coarse material, devoid of plasticity, which is obtained by grinding up the scrap material or (as is now more usual, particularly for high-class work) by burning clay and grinding it specially for the purpose. In this way, the texture of the finished material is opened-up, and it is accordingly rendered more refractory. This is due to there being less actual surface-contact between the material and the heat.

A further reason for adding "grog" is that the shrinkage or "sink" of the material after burning is reduced. This "sink" is probably more than is generally realized, and amounts to about an inch to an inch-and-a-half per foot for ordinary Staffordshire bricks, and three-quarters-of-an-inch per foot for retorts. As a matter of fact, the moulded size of a fire-brick before burning is $9\frac{3}{4}$ inches long, and the original measurement of a 24-inch by 16-inch retort is $25\frac{1}{2}$ by 17 inches.

The quantity of "grog" added varies, of course, with the kind of clay made use of, and the type of material required. Generally speaking, however, it is from 30 to 40 per cent. for retorts and from 15 to 20 per cent. for bricks.

With regard to the lining of water-gas apparatus, the conditions in the generator are very similar to those occuring in the retort-bench producer, and the same remarks apply to both. The temperature (about 1800° to 2000° Fahr.) does not necessitate the use of highly silicious bricks; and these are, moreover, undesirable, owing to the probability of the slagging action being set up. In the carburettor and superheater, the temperatures average about 1750° Fahr., and here, too, a good quality fire-brick of fairly low porosity is best employed.

WORKS STOREKEEPING.

[Communicated.]

A proper and methodical system of storekeeping is highly desirable in any works or factory. It is a branch of works management which is sometimes apt to be neglected with many ill-effects. There is no doubt that a slack system or no system at all will breed carelessness, and result in a waste of materials; for if the storekeeping be careless and wasteful, so will be the workmen in the use of materials.

The writer about a year ago fitted up a new stores, and instituted a simple and convenient system of storekeeping for a gas-works. The system, after a year's experience, has been found to be quite satisfactory and to have resulted in a somewhat unexpected saving of materials, and has at the same time been managed with a minimum of labour. To give some idea of the size of the works—for the writer would not suggest that a system so little elaborated would be at all suitable for very large factories—it will be as well to explain that the works in which the system to be described is used employs some 200 hands, has properly equipped engineering workshops, and a good deal of machinery of a very varied nature. The value of the materials which pass through the storekeeper's hands amounts to about £3000 a year, exclusive of the raw material used in the manufacture and purification of gas and other materials of a heavy nature.

It is found in practice that the card system is admirably suited for keeping account of all goods received and issued. Each different article has a separate card. The type of card (6 in. by 4 in.) in use is shown below.

STOCK CARD.

Catalogue No.	Description								
Date.	Received.	Taken Out.	For	Bal. on Hand.	Date.	Received.	Taken Out.	For	Bal. on Hand.

The date on which goods are either received or taken out is noted on the card with the quantity; a separate line being used for each entry. A column is also provided for noting the man who requires the material, the foreman who gives the order, or the job for which it is required. This column can be used to suit the requirements of different works. A fifth column is provided for entering the balance on hand at stocktaking times, weekly or monthly as required. When a card is finished, the balance left from the last entry of the previous card is carried forward to the "Received" column on the new card. Each card is similarly printed on the back with the same headings, though upside down, to facilitate the reading of the entries on the card when in the drawer. The cards are sufficiently large to take fifty entries. Guide cards, projecting above the others in the drawer, are provided for dividing the cards referring to the different varieties of materials into separate sections. On the guide card is noted the class of materials to which the cards refer in each particular section. Special drawers are provided to file the cards. At the base of the drawer is a brass rod, on which the cards are fitted in slots, and the cards may be readily removed when desired.

It should be explained that in the "Received" column of the cards the goods delivered are entered in some cases both by weight and number. For instance, supposing that 1 cwt. of 3 in. by $\frac{1}{2}$ in. bolts and nuts are received, the weight and the number of bolts would both be entered on the card, so that a balance could be struck at any time. This would apply to any class of materials which are ordered by weight and issued in numbers. And, again, all such things as packing, jointing, yarn, and waste are both ordered and issued by weight.

A delivery book (12 in. wide) is kept, and is ruled as shown. In this book are entered the goods delivered each day, and also the other particulars required. It is very necessary that such a book should be kept; and it is besides found of service should disputes arise as to articles damaged in transit.

Date.	Goods Received.	From	Per	Weight.		
				Gross.	Tare.	Net.

An issue-book is also kept, in which is entered daily the description and quantity of goods, by whom taken out, and for what job they are to be used. This book allows a more detailed description to be given of the purpose for which the goods are required, and also collects together all the materials given out on any particular day. This book is ruled as shown:

Date.	Name.	Description.	For.

No materials are given out without an order signed by a foreman, except in a few cases where men under one foreman are working in a variety of places, and where much time would be lost in finding the foreman. In these cases it has been found advisable to instruct the storekeeper to fill in the order form and obtain the foreman's signature at the end of the day. In this way, the foreman, who is, of course, fully acquainted with the details of each job under his charge, is made responsible for each article taken out of the stores by any of his men.

The order books used by the foremen each contain a hundred duplicated pages, 7½ in. by 4½ in. by ¾ in. in size. This is a very convenient size for the pocket. Each page contains two order forms, perforated and numbered. Each page is duplicated, and a carbon paper is used, so that copies of each order may be retained in the book by the foreman. This is in every way infinitely preferable to counterfoils. With a counterfoil the work of writing each order—and with some foremen this is a consideration—is doubled; and there is always the chance of mistakes in copying, whereas with a carbon paper it is impossible. There is, further, the advantage that with carbon papers the book is retained in its original shape, though thinner; while with counterfoils the book is halved in size, and must either be too large for the pocket when new or too small when used. Foremen have also been known to save themselves trouble by omitting to fill in the counterfoils. Neglect of this sort obviously spoils the system, as it is necessary, in keeping a proper check on the working of the system, to compare from time to time the entries in the foreman's order books with the materials issued by the storekeeper. It is also necessary to periodically compare the actual stock of the different materials in the stores with the balance in hand as shown on the cards. Checks of this sort on the part of the manager, or other responsible official, need take no longer than half-an-hour weekly.

STORES ORDER BOOK.

Date_____

Please give bearer_____

_____

_____

for _____

_____

Signed_____

The "Storekeeper's Requisition" book, in which is entered daily a list of materials required, may be a plain duplicate book (in the writer's case it is 6½ in. by 4 in.). Each alternate page is perforated; a carbon paper being used to retain a copy in the book for the storekeeper's use. The perforated sheet is torn out and given to the manager or other official responsible for ordering the materials. A copy of materials ordered is given to the storekeeper, so that he may keep an eye on the delivery of the goods, and see they are correct to the order. The storekeeper is also responsible for hurrying on the delivery of goods required.

Special attention is given to the prompt return of all empties for which a charge is made. Any package valued at 1s. or more, is returned with an advice note, and the charge crossed off the account. This is found to be a satisfactory method of dealing with empties. It saves book-keeping and unnecessary correspondence; and provided that firms have their packages promptly returned before the payment of the account, there is no objection to the adoption of this method.

In the case of all packages sent from the works, duplicated gummed labels are used (as per sample shown). By this means, should a package be lost, it is possible to trace full particulars of its dispatch. These labels are supplied in book form, and perforated for tearing out; a copy being retained in the book by means of carbon paper. It will also be noticed that on the copied portion a receipt may be obtained from the post office for goods sent by parcel post. This is a very good system, and well worth adoption in all works.

It has been found possible for one energetic man, with the assistance of a lad, to practically do the entire work of the stores. This man keeps the cards and the books, gives out the material when required, and receives all the goods and stores them away in their proper places. When it is realized that the value of the materials passing through his hands amounts to about £3000 per annum, that the number of different articles always kept in store is no less than 672, and that enough materials are stored to keep 200 men in regular employment, it will be seen that a methodical system and a strict rule that there should be "a place for everything and everything in its place," is conducive to economy in working. It should, however, be stated that heavy goods—such as machinery, bricks, timber, castings, bars of iron and steel—do not pass through the storekeeper's hands. Other arrangements are made for dealing with these articles. The head mechanic, bricklayer, carpenter, and blacksmith are respectively responsible for receiving and using materials of this nature.

The position of the stores is important. It should be situated in some central position if possible, as otherwise much time will be lost in the journeys to and fro for men requiring materials for their work. It should also be conveniently arranged for quickly unloading vans. It must be remembered that all materials are received in bulk, many of them being one hundredweight or more, so that it is important that means should be provided for lifting all heavy goods out of vans.

There is no doubt that the "Card System" is a real labour-saver, and no manager can afford to neglect the economy to be obtained from its use.

FROM [NAME OF COMPANY.]

Contents_____ Package_____ Weight_____

Date_____ Conveyance_____ Paid_____

Address.

Weight.		Postage Paid.		P.O. Stamp.
Lbs.	Ozs.	s.	d.	

An unregistered parcel addressed as above has been posted here to-day.

Signed_____ Postmaster.

FORTHCOMING MEETING OF THE AMERICAN GAS INSTITUTE.

THE annual meeting of the American Gas Institute will be held in Atlantic City (N.J.), on Oct. 16 to 18. There will be a President's reception on Tuesday, the 15th; and the banquet will take place on the Thursday. Elaborate arrangements have been made in the way of travelling facilities for the members; a number of special trains and special cars being scheduled to start from various points for the place of meeting. The papers announced to be read are as follows:

"Photometry of Incandescent Gas-Lamps," by C. O. Bond.
"The Behaviour of Water in Holder Tanks and Cups," by H. W. Alrich.
"Public Service Commissions," by Alten S. Miller.
"Small Gas-Engines," by Carroll Miller.
"Heat Balance in a Carburetted Water-Gas Set," by O. B. Evans.
"The Value of a Weight Balance in Coal Gas Manufacture," by C. J. Ramsburg.
"Effect of Cold Weather on the Gas Industry," by C. W. Andrews.
"Extracts from Bulletin, Bureau of Standards."
"Industrial Appliance Laboratory," by H. B. M'Lean.
"Report on the U. G. I. Vertical Retort Setting," by J. H. Taussig.
"State of the Art in Coal-Gas Manufacture," by W. H. Blauvelt.
"Description of New Bye-Product Plant at Joliet," by H. L. Rice.

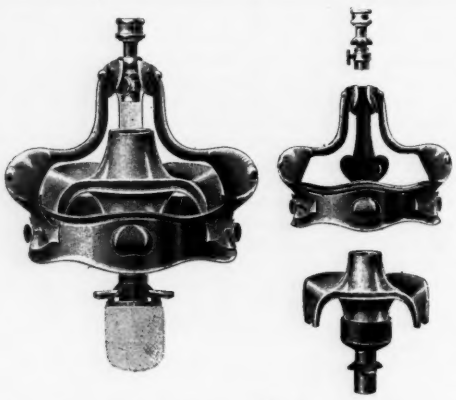
Electrical Installations on Oil-Fields.—A short time ago, there was a big conflagration in the Moreni oil-field, and this, the Government Inspector has reported, was due to a spark from an electric motor. He advises that electricity should be forbidden as a motive power in oil-fields, on the ground that electric motors as commercially supplied are so imperfect that they must produce sparks, either directly or through accessories, and that these sparks have often caused fires.

Institution of Municipal Engineers.—The fourth annual general meeting of the Institution of Municipal Engineers will be held in London on the 11th and 12th prox. The business will be transacted on the Friday, in the Council Chamber, No. 4, Southampton Row, W.C. The *agenda* includes the Presidential Address of Mr. Frank Latham, and the discussion of four papers, which will be printed and distributed in advance and taken as read. One of the papers submitted will be by Mr. A. Winter Gray, on "Superannuation and Security of Tenure." After the business meeting there will be a reception by the President at the Holborn Restaurant, followed by a social evening. The Saturday will be devoted to visits. A ladies' programme has also been arranged, to be carried out while the general meeting is taking place.

THE "LIFT-OFF" BURNER.

In spite of the large number of inverted burners at present on the market, there is still plenty of room, in the world-wide field open to incandescent gas lighting, for fresh ones that possess qualities entitling them to public favour; and it is therefore always a pleasure to welcome newcomers to the ranks. This agreeable task falls to be performed now, after an inspection of an arrival on whose behalf are claimed certain definite advantages. Perhaps, in one sense, it is not altogether correct yet to call it an "arrival," as it will probably not be ready for sale until early in November. Then everyone will be able to see for himself just what the "Lift-Off" inverted burner (now being introduced by Mr. Neville Edwards, of the Pneumatic Gas Lighting Company, No. 36, Farringdon Street, E.C.) is capable of doing.

The first points about the burner that strike one are its attractive appearance, its extreme simplicity, and its substantial design. There is nothing flimsy about the "Lift-Off" burner, which is equally suitable for the place of business as for the drawing-room. As its name implies, it can be lifted off and on to a fitting, and therefore the operation of detaching or attaching it is an instantaneous one. Not only so, but the three component parts of the burner (which are shown separately in the accompanying illustration) can be equally readily taken apart or assembled.



The "Lift-Off" Burner—And Its Component Parts.

Thus, in addition to the possibility afforded of removing the burner without trouble from one fitting to another that has been adapted to it, the work of cleaning can be carried out with the greatest ease. The top of the burner-cone is open; a space of about ¾ inch being left between it and the gas-injector above. Through this space the gas passes, taking with it automatically the air necessary to secure perfect combustion. It is found that the burner does not carbonize, and that it will not light-back. Therefore no air-regulator is needed; but there is a gas-regulator to deal with exceptional pressures, though with ordinary ranges of pressure this is not required. A specimen of the burner which was shown to the writer, and which it was stated had been in use for some considerable time, was absolutely as good in appearance as when new.

The whole arrangement is suspended from an ordinary gas-injector attached to the fitting by means of a half-ball joint arrangement, or collar, which forms part of the injector. The globe-carrier ring is supported from this collar by three arms furnished with a ball socket; the socket being arranged, as will be seen, so that it can be slipped on or off the collar. The mixing chamber (of the simplest imaginable type, of good size, and having a gauge inside) and its cup rest on supports provided in the globe-carrier; there being no direct connection between the chamber and the gas-injector. In this way, an efficient anti-vibrator exists, as the burner is free to swing at will on the collar or ball-joint. Formed with the projections from the body of the burner which attach it to the globe-carrier are three deflectors—this part of the burner being made either of aluminium or china—to turn aside the products of combustion which rise beneath. If the "Lift-Off" burner accomplishes in everyday practice under varying pressures all that is claimed for it, and that it certainly does in Mr. Edwards's office, it should prove an exceedingly useful addition to the stock of gas-lighting appliances. It is to be made in one—large—size.

Compressed Acetylene.—An Order in Council has been issued declaring that acetylene, when contained in a homogeneous porous substance with or without acetone, shall not be deemed to be an explosive, subject among others to the following conditions: The pressure shall not exceed 150 lbs. to the square inch; the porous substance shall fill as completely as possible the cylinder into which the acetylene is compressed; and the porosity of the substance shall not exceed 80 per cent. The cylinder shall be tested to not less than double the pressure to which it will be subjected in use, and shall have a fusible plug acting at or below 212° Fahr.; and when acetone is used, the quantity shall be such that, when fully charged, it does not completely fill the porosity of the porous substance. The Order comes into force on Oct. 1.

AN ADDRESS ON ENGINEERING

Before the British Association.

In the course of his opening address before Section G (Engineering) at the Dundee meeting of the British Association for the Advancement of Science, Professor Archibald Barr, D.Sc., the President of the Section, dealt with some interesting topics. After stating that it is too much to assume that engineers could meet all the reasonable demands of their immediate clients without producing, at least temporarily, secondary effects that may be of inconvenience to some members of the community, he referred in the following terms to the questions of the dust nuisance on roads and of the combustion of fuel. He shows the necessity for harder roads; and in this connection it will be recalled (*ante*, p. 668) that the Road Board, in their second annual report, which was recently issued, advise the use of proper materials with a bituminous binder.

When we examine into the immediate causes of the injuries and inconveniences that result from our activities, we find that they are due in all, or almost all, cases to failures rather than to successes. The more completely the engineer achieves the primary end of his work, the less is the damage or injury that can be laid to his charge. If it can be shown that this is a very general law, as I think it can be, we may look forward to the elimination, as a direct result of progress in the mechanical arts, of the nuisances and inconveniences for which, in some measure at least, we must accept responsibility. And not only so, but the converse will be equally true—the more we keep in view the removal or avoidance of anything that can cause offence, the more rapidly we shall advance in the attainment of the primary ends at which we are all of us aiming.

Consider, by way of example, the nuisance of which we hear so much—the raising of dust by motor-cars. I shall not discuss the debated question as to how far the motor-car produces dust, or only distributes it, nor shall I deal in detail with the possible remedies. For my present purpose, it suffices to point out that it is no part of the function of a road surface to fritter itself down into dust under traffic of any kind. The ideal road would be one that would not wear at all; and the nearer we approach this ideal of a permanent road surface, the less will be the inconvenience caused, not only to those responsible for the upkeep of the road, but to the general public. And conversely, the more attention we give to the devising of a dustless road, the more rapid will be our advance towards the provision of one best suited for all the purposes which a road is intended to serve. We had dusty roads before the motor-car came into being; but the demand that is being forced upon the engineer to eliminate this nuisance is leading to an improvement of our roads for all users.

Again, the combustion of fuel does little harm to anyone. It is the imperfection of the combustion that is the main cause—almost the sole cause—of injury to health, to property, and to the amenity of populous centres. Of course, one knows that smokeless combustion is not necessarily, nor always, the most economical; but that is only because we have not yet learned how to use fuel in anything like a perfect manner. All the tendencies at the present time, however, are towards improvement; and the more attention we pay to the elimination of the smoke nuisance, the more rapid will be our progress in the economical use of one of the most valuable of our inheritances. It is, therefore, clearly the duty of every engineer who has to do with power or heat production—for the credit of his profession, and even in the interests of his immediate clients—to consider the use and convenience of all who can be affected by the work for which he is responsible. The time is not far distant when the direct burning of bituminous coal in open grates will be looked upon as not only a source of serious harm, but as a culpably wasteful practice. Great progress has been made in processes for the partial distillation of coal by which a free-burning and quite smokeless fuel is prepared and valuable bye-products (so-called) are conserved. If all engineers concerned with the design and application of plants in which coal is used had a due sense of their responsibilities to the community, progress would have been, and would to-day be, much more rapid; and economies would be effected that would, in themselves, amply justify the application of more scientific methods of utilizing the constituents of a very complex material, which we are too apt to look upon as merely a convenient source of heat—plentiful enough and cheap enough, as yet, to be used in a most wasteful manner. It will not be to the credit of our profession if it should require restrictive legislation, not only to prevent a gross interference with the health and comfort of the community and the amenities of our centres of industry or of population, but to effect economies in the utilization of the chief sources of power which it is admittedly our function to direct to the best advantage of all concerned.

In other directions, also, we see that progress towards economy is leading to a reduction, and possibly to the entire elimination, of all the nuisances associated with the older methods of power and heat production. The great improvements that have recently been made in producer plants and gas-engines have rendered out of date, as regards economy, at least the smaller sizes of steam-plants which are so fruitful a source of injury and inconvenience to the community; and we now have engines of the Diesel, and

the so-called semi-Diesel, types that can utilize natural oils, as well as oils obtained in the distillation or partial distillation of coal, not only with an efficiency hitherto unattained in heat-engines, but "without injury or damage to any one single person"—except possibly the maker of inferior plants.

In subsequent remarks, Professor Barr expressed the opinion that present indications point to the coming of a time, in the near future, when the power and heat required for industrial and domestic purposes will be distributed electrically from large central stations, as suggested by Mr. Ferranti.

EFFECT OF TARRED ROADS ON VEGETATION.

The current number of the "Zeitschrift des Vereines der Gas- und Wasserfachmänner in Oesterreich-Ungarn" contains an article, by Herr F. Fischer, of Stuttgart, on the use of gas tar for road surfacing, in which some points of general interest are raised.

The author refers to the greater use of tar for road surfacing in France and England, and in Monaco, where the pioneer of road tarring, Dr. Guglielminetti, lives. In Germany, road tarring has been so far mainly restricted to the Rhine Province, and in Austria to Prague. It is interesting to notice how every possible objection has been made to the use of tar—as, for instance, the alleged injurious effect of ordinary tar on vegetation. The Paris botanist, Dr. Marcell Mirande, especially inveighed against gas tar, which, he alleged, was solely responsible for the destruction of vegetation in the Bois-de-Boulogne. The Paris engineer, M. Griffon, by some careful investigations and experiments, refuted these allegations. As a result of these attacks, however, Lasailly prepared a vegetable tar by careful distillation which would contain none of the constituents injurious to the growth of plants. The author is not aware whether more favourable results have been obtained with this costly preparation than with ordinary gas tar. At Bordeaux, an important promenade roadway has for years been continuously treated with ordinary gas tar without injury to a single tree. The trees in this case include the white poplar, the maple, the oak, the walnut, and even the sensitive lime. At Montpellier, the streets have been tarred for many years with ordinary gas tar, and the beautiful plantains thrive far better than before the streets were tarred. This will be readily understood if it is realized that dust with its destructive action is almost entirely suppressed by tarring. Professor Saunier, of Rouen, has ascertained by inquiry of all the French Departments that ordinary tar, applied either cold or hot to the surface of roads, has been found not to have the slightest injurious effect, except that in Fontenay-le-Comte the trees suffered by the tarring of an open space. In this case, the tar was spread right up to the trees, which is a piece of negligence which was probably responsible for the injury to the vegetation in the Bois-de-Boulogne also.

As far as Austria and Germany are concerned, the author has made inquiries which have disclosed no case of injury to vegetation from the use of gas tar. Herr Lipps, Surveyor of the Rhine District, states that he has never known a case of injury to vegetation from tarring. The Surveyor of Steglitz came to the same conclusion, and the Surveyor at Dantzig reported that at the most plants with a specially sensitive epidermis may have been slightly injured by crude tar. On the other hand, the Chief Engineer at Alexandria, in Egypt, as the result of extended trials, testifies that undistilled gas tar is not injurious to plants. In a very interesting report, he gives the following brief summary of his trials.

In the first set, he passed samples of air from above a tar-boiler through distilled water, and tested the water. The air at a height of 10 feet above the boiler gave an alkaline reaction, due to the presence of ammonia, but the air at heights of 16 feet and 32 feet produced no reaction. In the second set of tests, he collected the dust from tarred roads, and found that five days after tarring it had a strong phenolic reaction, ten days afterwards a feeble phenolic reaction, and fifteen days afterwards a very feeble reaction. In the third set of tests, he took samples of soil five and ten days after tarring at different distances from the tarred footway. At 16 feet from the footway five days after tarring, a very feeble phenolic reaction was obtained; but at 32 and 48 feet away, there was no reaction. Ten days after tarring there was no reaction either at 16 feet from the footway or at greater distances. In the fourth set of experiments, he aspirated the gases rising above the rim of a tar-boiler through four wash bottles containing in series, A and B, absolute alcohol; C, 25 per cent. alcohol; D, distilled water. In the last bottle ammonia was detected, and the alcohol on distillation gave off vapours having an alkaline reaction. The same test was made at a distance of 16 feet from the tar-boiler, and a feeble reaction of ammonia was obtained. In the fifth series of tests, no reaction was obtained from the dust collected on leaves of plants round about. These experiments show, the author says, that in Egypt the streets treated with gas tar have been entirely uninjurious to vegetation. The earth within twelve to fifteen days has completely absorbed the caustic qualities of the tar dust.

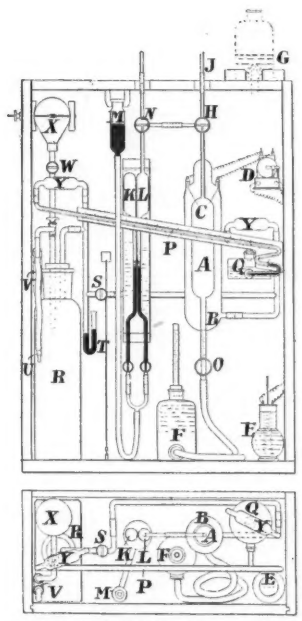
The author then proceeds, for the guidance of Austrian gas managers as to the treatment of tar intended for use on roads, to quote tests of tar which have been recommended by road authorities in the United States.

A NEW STRACHE GAS CALORIMETER.

In a recent number of the "Journal für Gasbeleuchtung," Herr Albert Breisig, of Vienna, gives a detailed report on the latest pattern of Dr. Strache's gas calorimeter, and its use for estimating the combustible constituents of gaseous mixtures and the gasifiable constituents of solid and liquid bodies, as well as for determinations of the calorific power of gas. The following is a summarized translation of Herr Breisig's communication to our contemporary.

The principle of Dr. Strache's gas calorimeter has already been described. [See "Journal," Vol. CXI., p. 387.] The instrument measures the heat liberated by the explosive combustion of 30 or 60 cc. of the gas, through a pressure-gauge which shows the expansion of the air in the jacket surrounding the explosion pipette. It has the advantages over most types of calorimeter of being self-contained, portable, requiring very little gas for a determination, being applicable to all kinds of gases, rapid in use, simple and exact, and independent of temperature and barometer readings and correcting factors. In the first pattern of the instrument, however, the petroleum used as the gauge liquid was in a prolongation downwards of the air-jacket directly fused to it. Apart from the great liability to fracture of this construction, the readings were affected by temperature owing to the vapour-tension of the petroleum. The difficulty thus arising could be largely overcome by standardizing the instrument with hydrogen at the mean temperature of use. Petroleum or water vapour was liable, however, to condense in the explosion pipette, and to be volatilized again when the explosion took place.

The new pattern of the calorimeter has been devised in order to overcome these faults and to make the readings independent of temperature. The correctness of the setting of the calorimeter can be readily checked, and the portability of the instrument has been increased by the avoidance of very fragile glass joints in its construction.



Strache's New Pattern Gas Calorimeter.

The new pattern of the calorimeter is shown in vertical and horizontal section in the annexed illustration, in which A is the glass explosion pipette surrounded by the glass air-jacket B. The wires C for igniting the gas pass through the jacket to the pipette, and are connected with the induction coil D and the battery E. The pipette is filled with water to the level of the side connection by raising the levelling bottle F to the stand G on top of the case of the instrument, while the three-way tap H is turned to allow the air to escape from the pipette through the tube J to the open air. The vessels K and L are of exactly the same capacity, and communicate (as shown in the illustration) with the same mercury levelling vessel M. A volume of about 30 cc. of air, of which the exact volume at standard temperature and pressure has been determined, is enclosed in K, and a scale is provided, on the narrow tube in which K terminates below, so that any change in volume of the enclosed air can be readily detected. The gas to be examined is drawn through the upper tube and tap N into the vessel L until the mercury stands at the same level in the narrow lower tubes of both the vessels K and L. The volume of gas taken in L is, therefore, exactly equal to the volume of air in K, the equivalent of which in standard conditions is known. There are a few drops of water in both K and L, which are enclosed in the same water-jacket, and therefore at the same temperature.

The known volume of gas thus enclosed in L is passed, by turning the taps N and H, into the explosion pipette A. The quantity

of mercury in the levelling vessel M must be such that when the vessel is in its upper clamp the small quantity of water above the mercury in L rises exactly to the tap N. Air is then drawn in to the explosion pipette through the tap H, until the water has run down to the tap O (and therefore stands at the same level in the tube attached to the top of the levelling vessel F). The expansion and increased pressure of the air in the jacket B surrounding the explosion pipette A, which ensue on explosion of the mixture of gas and air in the latter, are measured by the inclined gauge tube P, which is connected with the bottle Q below the level at which the gauge liquid (for which tinted paraffin oil is preferred) stands in it. The free space in the upper part of the gauge-bottle Q is connected with the jacket B. The gauge liquid stands at the zero of the gauge tube P when there is equal pressure on both sides. The other end of the gauge tube P is not left open, (as the fluctuations of atmospheric pressure would cause continual movement of the gauge column) but is connected with the bottle R, the pressure in which and in the jacket B can be equalized by the cross-tube with the tap S. The difference between this pressure and the atmospheric pressure is shown by the mercury gauge T. It is essential always to have the same quantity of air in B and R as when the instrument was first standardized.

This can be achieved in the following manner: The volume is stated for a particular pressure and temperature in the certificate of standardization of the instrument. Then the change of volume of the air in the control vessel K, with changes of pressure and temperature, serves to give the volume in B and R (in the prevailing conditions), which corresponds with the volume in the certificate in the conditions of standardization. With L open to the air, the mercury vessel M is lowered until the level of the water above the mercury in the bottom tube of K corresponds with a standard mark on the tube. The difference of level of the mercury in the bottom tubes of L and K is then read off, and, after deduction of the vapour-pressure for the prevailing temperature, represents the pressure-difference which the mercury in the gauge T should show when B and R contain the volume of air corresponding to that stated in the certificate. More or less air is blown in or drawn out of B and R, until the required pressure on the gauge T is shown, through the mouthpiece U of the tube with the calcium chloride drying tube V. A fine adjustment is obtained by opening the tap W and increasing or diminishing the capacity of the rubber ball X by means of the screw at its side, which alters the pressure on it. Vapour of petroleum is prevented from passing from the gauge-bottle Q into B and R by the bulbs Y, which are packed with cuttings of rubber, by which petroleum vapour is absorbed. If, however, petroleum should happen to gain access to B and R in condensible quantity, B and R must be freed from it by passing dry air through them for some considerable time.

The taps H and O have to be closed before the gas is fired, and the pressure-gauge set by opening and closing tap S. The gas is fired by lowering the zinc into the liquid of the chromic acid battery E. The zinc is automatically withdrawn after use, by means of a spring, to avoid waste of the liquid. In order to obtain the heat of combustion of the gas at constant pressure, the tap H is opened to the air a few seconds after the explosion. Immediately after explosion, the liquid rises in the gauge tube P, and the maximum height which it reaches is observed. The upper scale on P shows the gross calorific power of the gas in large calories per cubic metre in standard conditions; the lower scale the quantity of heat (in small calories) that is actually developed. After these readings have been made, the explosion pipette is filled with water. About a quarter of an hour, however, elapses before the liquid in the gauge tube returns right to zero. But in practice, about three minutes after the first test, the gauge is brought to zero by opening the tap S, which allows air to pass from B to R. There is then a smaller mass of air in the jacket B than for the first determination; but the second and subsequent determinations are made with this smaller mass, with which the original standardization has also been made. Thus determinations are made, in succession, at three-minute intervals; the mean of all, except the preliminary test, for one sample of gas, being taken as the calorific power of the gas. The water in the levelling bottle F will rise slightly in temperature after each explosion, and it should therefore be renewed from a larger store of water at the temperature of the room. The apparatus is standardized against pure hydrogen, of which the gross calorific power, according to the latest determinations, is 3090 large calories per cubic metre at 0° C. 760 mm. and dry (324 B.Th.U. per cubic foot at 60° Fahr. 30 in. and saturated).

The actual procedure in making a determination is much more rapid than the foregoing detailed description of the apparatus would suggest. The whole manipulation for a single test can be comfortably performed within three minutes. No preliminary preparation of the calorimeter for a test is needed—as soon as the connection to the sample of gas has been made, the test can be carried out. It is, however, advisable to blow off a preliminary charge of gas from the explosion pipette through the tap H and tube J, in order to get rid of air in the connection. The connection must not be of rubber tube of any considerable length, as coal gas loses many heat units through contact for a few minutes with rubber tube.

The author gives details of the standardizing tests with hydrogen of several instruments. The figures show that the extreme deviations from the mean of a number of readings are only 0·5 per cent. A trial of one instrument for several months with hydrogen showed that the same degree of exactness was maintained in continuous use. Other gases were tested in the instrument with the following results: Carbonic oxide, produced by dropping formic acid into hot sulphuric acid, and actually consisting of 97·5 per cent. of carbonic oxide and 2·5 per cent. of carbonic acid, was found to have a calorific power of 3032 calories per cubic metre of pure carbonic oxide. Methane, prepared from aluminium carbide—and containing actually 22·8 per cent. of hydrogen, 0·6 per cent. of nitrogen, and 76·6 per cent. of methane—showed 9580 calories per cubic metre of pure methane. In the case of carbonic oxide, an additional pipetteful of carbonic oxide or one of hydrogen had to be taken, and in that of methane one of hydrogen, in order to secure a completely combustible mixture. The values obtained agree closely with the accepted calorific powers; so that it may be regarded as proved that complete combustion was secured. Producer gas, from wood charcoal, of which the combustible constituents were carbonic oxide, 16·9 per cent., hydrogen 2·6 per cent., and methane 1·1 per cent., when exploded with an equal volume of hydrogen, gave 699 calories per cubic metre, as compared with a value of 697 calories calculated from analysis. A second sample showed 1160 calories, against 1130 calories calculated, and a sample of semi-water (Dowson) gas 1050 to 1063 calories, against 1068 calories calculated. Any readily ignitable gas, of which the calorific power has been previously determined, may be used in place of hydrogen in order to ensure complete combustion.

The instrument may also be applied to determine the calorific power of the gaseous products of solid and liquid materials; and the calorific power of coal itself may be deduced from the determinations, as described last year by Dr. Strache. [See "JOURNAL," Vol. CXVI. p. 462.]

The author made comparisons of the results obtained on a sample of coal gas, stored for several days in an experimental gasholder, with the Strache calorimeter and the Junkers calorimeter. The Strache instrument had been carefully standardized on pure hydrogen. It gave directly, as the mean of three tests extending over a quarter of an hour, a calorific power of 4814 calories per cubic metre at 0°C., 760 mm. and dry (504 B.Th.U. per cubic foot at 60° Fahr., 30 in. and saturated). The Junkers instrument gave directly, in a five minutes' test, a value of 4880 calories per cubic metre (511 B.Th.U. per cubic foot). But the corrections which should be applied to this result were ascertained, as follows: Error in experimental meter, − 50 calories; error of inlet thermometer, + 25 calories; error of outlet thermometer, − 34 calories; correction of weight of water weighed in air to weight in vacuo, + 5 calories; heat introduced by the gas, − 17 calories, and by the air supply − 102 calories; and heat carried off by the gaseous products of combustion + 73 calories, and as specific heat of the condensed water + 13 calories. These corrections give a total of − 87 calories, which if deducted from the uncorrected value of 4880 calories give the figure 4793 calories (502 B.Th.U. per cubic foot), which agrees well with the result obtained with a Strache calorimeter, to which no such corrections have to be applied.

The author has observed that in many gas-works in Germany and Austria, the experimental meters read 3 per cent. too high or too low, and that thus false comparisons are made of the calorific power of the gas produced at different works. The other errors to which the Junkers calorimeter is subject mostly depend on the fluctuations of temperature of the water and room and the humidity of the air, and therefore vary with the time of year. Thus works which endeavour to keep to a uniform calorific power of the gas supplied are in reality, when the Junkers calorimeter is used, working to a standard which varies with the season. The Strache calorimeter, being independent of the experimental meter and atmospheric conditions, may, the author thinks, be usefully employed for controlling the readings obtained with the Junkers calorimeter—especially in its recording form.

Last Tuesday, at St. Margaret's Church, Great Barr, the marriage took place of Mr. Oswald George Eveson (second son of Mr. and Mrs. G. J. Eveson, of Springfield Hall, Knowle) and Miss Dora Holden (only daughter of the late Mr. Edward Holden and Mrs. Holden, of Cartref, Walsall, and grand-daughter of Sir Edward Holden, of Glenely, Walsall). Owing to the recent death of Sir Edward Holden's grandson, only relatives and a few friends were asked to attend the reception; but a large number of friends and well-wishers assembled at the church. Mr. Oswald Eveson is engaged with his father and brother in the business of the Eveson Coal and Coke Company, Limited, in Birmingham.

The "Announcements" for the session 1912-13 of the Northampton Polytechnic Institute, Clerkenwell, have been issued by the Principal (Dr. R. Mullineux Walmsley), and they indicate the extensive facilities that are offered to students. There are day or evening courses, or both, in mechanical and electrical engineering, technical optics, technical chemistry, metallurgy, and many other branches. The half-time trade courses in technical chemistry inaugurated last session are being further developed. In these classes the students, all of whom are engaged in commercial workshops, are in attendance from 9.0 a.m. to 1.0 p.m., and spend the afternoons in their employers' workshops. The experiment appears to meet the needs of all the particular trades mentioned; and if it continues to be as successful as in the past year, it will probably be extended to other trades.

ELECTRICAL SEPARATION OF TAR FROM COAL GAS.

By Alfred H. White, John W. Hacker,* and F. Steere.

[A Paper submitted to the Michigan Gas Association.]

The questions of the proper rate of condensation of coal gas, the proper temperature at which the suspended tar globules should be separated, and the proper point in the process at which the gas should be first scrubbed with water, have formed the subjects of many papers presented to Gas Associations. Practical considerations have, however, limited very much the possible scope of experiments on these points; for the only feasible means of removing the suspended tar particles has been by frictional separators or by scrubbing, which operations can only be carried on effectively after the gas has been cooled. The question whether it would be better to remove tar from the gas while it is still hot, although it has been debated warmly, has been largely discussed from a theoretical standpoint.

Our attention was directed to the possible applications of the silent electric discharge to the purification of illuminating gas by the paper of Dr. F. G. Cottrell, on "The Electric Precipitation of Suspended Particles," which appeared in the "Journal of Industrial and Engineering Chemistry" for August, 1911. In this paper, Dr. Cottrell reviewed the work of earlier experimenters, and showed the successive steps of the development of his process, up to the point of successful installation of a plant precipitating the objectionable fumes from a giant smelter, or the dust from a rotary kiln of a portland cement plant. This process claimed our attention not only because it offered an opportunity for experimental work in a way hitherto unattempted, but also because it afforded at least a possibility of commercial application.

Dr. Cottrell's figures on the amount of electric power consumed by the process were startlingly small; only 120 kilowatts being required to remove the suspended particles from a volume of gas requiring a flue with a cross section 18 ft. by 20 ft. for its passage, and amounting to between 200,000 and 300,000 cubic feet per minute. This remarkable showing prompted us to consider whether the same process might not be applied to the elimination of suspended tar and liquor particles from illuminating gas; and experiments were at once started to determine this point. It has been possible to make only a beginning of the solution of the problem; but enough has been accomplished to show that the process offers much promise of commercial success. This paper describes the general principles of the process, and gives some account of the experimental work carried on at the Gas Experiment Station of the Michigan Gas Association and in the laboratories of the University of Michigan.

The disappearance of dust clouds under the action of an electric discharge was observed many years ago; but the credit of independently rediscovering the fact, and bringing it to the attention of the public, is due to Sir Oliver Lodge, who, in 1886, delivered an illustrated lecture on the subject of the electrical deposition of dust and smoke before the Liverpool Section of the Society of Chemical Industry. His experiments had been previously brought to the attention of Dr. Alfred Walker, who, after experimenting on the small scale at his Bagillt smelter, installed a full-sized equipment to treat all the fumes from this plant. The only source of high tension current available in those days was the static machine; and this plant was to be operated by two Winshurst machines, with 5-feet discs, driven by a small steam-engine. No record seems to have been published of the success of this project; but its failure is probably to be ascribed to the uncertainty of operation of the electric generator. Dr. Walker took out a patent in the United States in 1886 (No. 342,548), a part of whose claim reads, "consisting in causing the fume . . . to be subjected to a discharge of electricity from an insulated conductor situated in the flue," &c. This patent, which broadly covered the principle of the use of the electric current, has expired; so that there is no basic patent on the process.

It has become possible within more recent years to readily obtain alternating current at any desired voltage; but it has not been so easy to obtain direct current at high voltages. Sir Oliver Lodge himself took out a patent in the United States (No. 803,180 of 1905) covering the use of a combination of mercury arc rectifiers for producing high-tension direct current. In 1908, Dr. Cottrell took out a United States patent (No. 895,729) covering, among other things, the use of a rotating switch, driven by a synchronous motor, to rectify the high-tension alternating current, and the use of "pubescent" electrodes of cotton, asbestos, &c., which, by their multitude of fine points, facilitate the silent discharge. Other subsequent patents have been granted to him; and by the aid of his inventions the process has been made commercially successful for the deposition of smelter fumes, as mentioned at the commencement of this paper.

Dr. Cottrell decided, with magnificent generosity, to relinquish all claim to personal profit from these patents, and give them in trust that the income might be used for the advancement of scientific knowledge. Accordingly, there has been organized the Research Corporation, with nominal capital stock and a strict provision that no dividends shall be paid. The purpose of the Research Corporation, as expressed in its certificate of incorporation, is as follows: "(*b*) To provide means for the advancement and extension of technical and scientific investigation, research, and experimentation by contributing the net earnings of the Corporation, over and above such sum or sums as may be reserved or retained and held as an endowment fund or working capital, and also such other moneys and property belonging to the Corporation, as the Board of Directors shall from time to time deem proper, to the Smithsonian Institution, and such other scientific and educational institutions and societies as the Board of Directors may from time to time select, in order to enable such institutions and societies to conduct such investigation, research, and experimentation." Dr. Cottrell has given his patents to the Corporation, who have already issued contracts for preliminary installations at several smelters, and are actively engaged pushing the work.

Our first experiments in removing suspended tar particles from illuminating gas were made with a small electrostatic machine, connected to two wires hung in a vertical glass tube, into which crude coal gas was led from a small retort. With the machine not in operation, the tube filled with thick yellow vapours. On starting the machine, it seemed the glass disc had barely begun to move before the tube was clear. An apparatus for rectifying alternating current was then patched up out of available equipment. The first experiments with this were made with an inverted bell jar. A wire connected to water in the bottom of the jar formed the negative electrode; a piece of flannel covering the open top of the jar formed the positive pubescent electrode. Tar vapours were led in through a glass tube. The jar, initially filled with a thick smoke, cleared almost instantly when the current was applied; and it could be seen that the fumes were being beaten down to the water. It was feared that the formation of a tar film on the surface of the water would stop the action; but this was not the case. Even when ½-inch of tar was purposely poured into the bell jar, the action continued unchanged.

Experiments were then transferred to the Gas Experiment Station, where the gas from one of the regular retorts of the Ann Arbor Gas Company was treated. The separator was adapted from a miniature Pelouze and Audouin tar-separator, and consisted of an iron cylinder, 12 inches in diameter and 20 inches high. A tin can, usually wound with cloth, hung in the centre of this cylinder, and formed the positive electrode. The wall of the cylinder formed the negative electrode, and was, for the safety of the operators, connected to earth. Gas entered at the centre of the bottom, and rising, traversed the annular space between the two electrodes, and escaped through a pipe near the top of the outer casing.

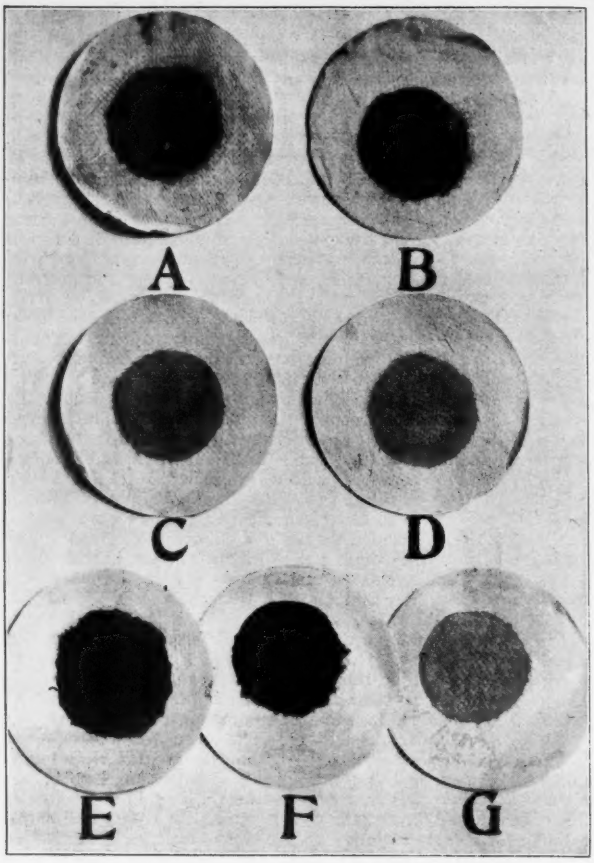
The gas to be purified passed from the retort through a condenser, then through the electrical separator, and from the separator to the exhauster. It thus was heavily loaded with tar when it entered the separator. We have treated this gas at temperatures varying from 75° to 150° Fahr., and have been able to so completely eliminate the tar that the gas leaving the separator appeared perfectly colourless if allowed to stream into the air, and left only a faint brown stain on a piece of filter paper through which a cubic foot of gas had been filtered.

The illustration (p. 826) is a photographic reproduction of several of these filter papers, together with two for comparison, taken in the commercial plant of the Ann Arbor Gas Company. Filter paper A shows the effect of filtering a cubic foot of gas at the outlet of the Pelouze and Audouin separator in the commercial plant, and B is a photograph of the paper taken at the outlet of the rotary ammonia scrubber of the same plant. Papers C and D were both taken at the outlet of the electrical separator; 1 cubic foot of gas being filtered in each case. Paper C was taken soon after a fresh charge of coal had been thrown into the retort; so that it represents the most difficult period for tar separation. In this case, the temperature at the inlet of the electric separator was 110° Fahr. Paper D was taken toward the end of the carbonization period, when less tar was coming off. It will be noted that both these papers show a better tar removal in 12 vertical inches of the electric separator than was accomplished in the commercial plant by the Pelouze and Audouin tar-separator, secondary condenser, tar-washer, and rotary ammonia washer.

When starting a test with a clean electrode, we have been able to operate the separator continuously through a full test of five hours. In test 92, the electric separator operated continuously throughout the whole five hours with inlet temperatures ranging from 154° to 130° Fahr. The charge was 400 lbs. of Pittsburg coal, and from the products the condensers separated 12·8 lbs. of tar and 12·2 lbs. of water, while the electric separator immediately following separated 17·7 lbs. of tar and 2·8 lbs. of water. The separation of tar and liquor in the electric separator cannot be laid to friction, because the separator was perfectly empty, except for the electrode hanging in the centre; nor can it, except to a slight extent, be laid to drop of temperature in the electric separator, for the difference between the inlet and outlet temperatures due to air-cooling was only about 25° Fahr. There can be no question but that this separator, through the electric action, was almost completely freeing the gas from the suspended tar and water particles during the four or five seconds in which the gas was passing through the annular space, 12 inches high, between the electrodes.

We were, however, not always successful in operating the separator continuously. Sometimes the silent discharge became disruptive when the action of the separator ceased, until the silent discharge was restored. The disruptive discharge was most apt

* Holder of the Michigan Gas Association Fellowship at the University of Michigan for the year 1911-12.



Showing Amount of Suspended Tar on Filter Papers.

One cubic foot of gas was passed through the paper in A, B, C, and D; one-third of a cubic foot was passed through E, F, and G.

A, outlet of Pelouze and Audouin tar-separator (Ann Arbor Gas Company); B, outlet of rotary scrubber (Ann Arbor Gas Company); C, outlet of electric separator; D, outlet of electric separator; E, outlet of electric separator—no current on; F, outlet of electric separator a few minutes later, using 0·06 kilowatt—20,000 volts; G, outlet of electric separator a few minutes later, using 0·1 kilowatt—30,000 volts.

to occur when the cloth wrapped around the positive electrode had become coated with tar. Presumably, the fine hairs constituting the points from which the silent discharge occurred had become matted together. Theoretically, the positive electrode should remain clean, because all the tar particles should be blown away from it; and perhaps this desirable state may be attained in a commercial plant operating continuously. Trouble was also experienced with the insulation of the positive wire as it passed into the apparatus. Rubber insulated wire, wires insulated by glass and by successive layers of glass and paraffin, as well as other devices, were tried. None of them was entirely satisfactory. Leakage of the current could always be detected, and sometimes it became excessive. Most of our time has been devoted to a study of the correct form of electrode and to proper insulation.

The power required to operate the electric separator cannot be given with any certainty. The transformer with which most of our experiments were made was in bad condition, and required about 0·25 kilowatt for its excitation. It was not possible to detect with certainty any difference in the readings of the watt meter on opening and closing the high-tension switch leading to the separator. More recently we have acquired an auto transformer much better suited to our work. Some idea of its operation may be gained by filter papers E, F, and G, which show results obtained by filtering one-third cubic foot of gas in each case. E represents a paper taken at the outlet of the separator when the gas was passing but no electricity was being used; F represents a paper taken a few minutes later, when the input into the transformer was 0·06 kilowatt and the instrument was set for 20,000 volts; G shows a paper in the same series with 0·10 kilowatt input and the transformer set at 30,000 volts. To obtain the amount of power actually used by the separator, we should deduct from these figures the transformer loss and leakage. The latter is undoubtedly high with our present installation.

Our knowledge of the theory of this electro-deposition is not sufficient to enable us to make any calculation as to the amount of power theoretically required. The suspended particles in some way acquire an electric charge, possibly through the condensation on their surface of gaseous ions formed by the silent discharge. The particles thus charged are swept to the electrode of opposite polarity, and deposited there. It will be seen, therefore, that the process requires a unidirectional current. If an alternating current is used, it is not without effect, for there seems to be a coagulation of the suspended particles, which gradually become large enough to settle through gravity. To obtain effective results, a high-tension direct current must be used, and the apparatus must be so arranged as to obtain a silent, and not a disruptive, discharge.

With a knowledge that almost complete separation of particles of tar and liquor suspended in coal gas can be obtained in a single electric precipitation, and the success of the electric process of removing smelter fume on the large scale at small expense, demonstrated that it is well worth while to carry the experiments further. If the complete removal of tar at any desired temperature can be assured, there will follow fascinating possibilities of increased economics in condensation, less expensive plant, better ammoniacal liquor, freedom from naphthalene stoppages, longer life of purifying material, and richer gas.

GAS POWER IN TEXTILE MILLS.

At the Congress of the Textile Institute just held at Hawick, four papers were read on the subject of "Power in Textile Mills." They dealt respectively with steam, gas, oil, and electricity, and were intended to form a general introduction to the detailed treatment which the question is to receive from a Special Committee appointed to investigate and report on the best methods of driving machinery in textile factories.

Steam.

The case for steam was put forward by Mr. G. B. Storie, who remarked that in selecting a prime mover for driving a textile mill the chief factors to be considered were reliability, uniformity of speed, and economy. He set himself to show that with steam engines or turbines these three requirements could be fulfilled, irrespective of the manner in which the power was conveyed to the machines in the factory. The steam-turbine, he said, was likely to play a great part in the driving of textile mills in the future. As regarded reliability, about which there was some doubt when the earlier machines were installed, there was now no question; and the turbine ranked in service with the reciprocating engine. In respect of uniformity of speed the turbine offered very great advantages, as, owing to its absolutely uniform turning movement, combined with great storage of kinetic energy in the revolving parts, the speed regulation could be accomplished in a more efficient manner than was possible with reciprocating engines. It was no uncommon practice to judge the economy of an installation by the fuel or steam consumption. This, however, alone was not sufficient to allow of a true estimate being formed of its over-all economy, as many instances could be given where the running costs of prime movers, working with low fuel consumptions, were exceptionally high—so high, in fact, that any gain due to the reduced fuel consumption was more than counterbalanced by extra expenditure in repairs, attendance, and stores. It was therefore imperative, when new plant was in contemplation, that the steam-user should take means of ascertaining how many other items had to be added to the cost of the fuel, in order to know how much the production of his power would cost, before he decided upon the prime mover that was to drive his mill. Only after all the expenses were taken into account would it be found what share the cost of the fuel had in the total result.

Gas.

The paper on gas-engines was prepared by Mr. T. R. Wollaston, who first considered the objections sometimes made to the installation of such engines in textile mills. He maintained that they were now as easy to start as any steam-engine, if not easier; there was no difficulty in maintaining a steady quality of gas if suction plant was not used; the over-all cost of the plant was no greater than that of steam; the liability of gas plant to breakdown was steadily decreasing; the regularity of turning was amply sufficient; the space occupied might be greater, in the case of large powers, but the parts of the plant could be coupled together in many ways, so as to utilize waste space, and the distance between gas plant and engine was of no consequence; and the reliability of gas plant was unsurpassed by the majority of steam installations. While acknowledging that suction-gas plant had been largely instrumental in popularizing gas power, he expressed the view that it was responsible for at least one-half of the unsatisfactory installations of gas-power plant in textile mills, owing to the lack of proper provision for correct regulation of the quality of the gas. He said that electricity to his mind did not enter into the question as a competitor. Electricity at present was not a source of power, but a means of transmission. He believed it to have a great future in the textile industries, and claimed that everything he might say in favour of gas power for mechanical driving in textile mills applied with added importance in regard to the generation of electrical energy, whether at the mill or at the central station supplying the mill.

The fuel cost per brake-horse-power-hour for the gas-engine, as compared with that for a high-class steam-engine, was in the ratio of about 5 : 9. Taking the gas-engine fuel at 1¼ lbs. of coal, and that of the Diesel engine at ½ lb. of oil per brake-horse-power-hour, costing respectively 11s. and 50s. per ton, the fuel costs were

as 14 : 25. Steam was always required in textile mills. About 2 lbs. of steam per hour per horse power driven could be obtained from boilers coupled to the exhaust of the gas-engines, or probably about one-half the total required; and much of the balance could be got by burning the tar under the boiler. A ton of tar was produced by 25 tons of coal, and was equivalent to a ton of coal. The stand-by losses of gas-engines were about one-quarter those of the average boiler-house. Incompetency or carelessness frequently led to considerable loss in steam plant; but like carelessness could not well affect gas plant in the same way. The stoking was a purely mechanical operation, performed as well by a novice as by an experienced man; and the engineer in charge need give only very occasional supervision.

The rate of gas production in well-designed producer plants was regulated automatically, and the efficiency fell away very little on low loads. The efficiency of the gas-engine on low loads was considerably higher than that of the steam-engine, and much higher than that of the steam-turbine. There were with the gas plant no high-pressures, no losses equivalent to pipe condensation, and no non-conducting coverings to provide and maintain; and the maintenance charges upon a well-managed gas plant were considerably lower than upon the equivalent steam plant.

The author went on to say that a point which seemed of the utmost importance in considering gas power for textile mills other than spinning and weaving, was that it appeared that of the total steam raised in such mills as a rule only about one-third went to drive engines—the balance being used for heating and boiling. There was no occasion to point out the enormous losses thus entailed in condensation during work and after stoppage. Gas might be taken practically any distance to its work without measurable loss; and it could be applied to dry, heat, or boil with far greater ease and facility of control than was possible with steam. Then an advantage peculiar to gas power alone was the recovery of the bye-products—sulphate of ammonia and tar. The amount of the former obtainable from a ton of average coal was about 90 lbs. This was to-day worth 11s.; in other words, it was as valuable as the coal from which it was derived. The tar was of less value.

For a large textile works with several departments, requiring 3500 B.H.P., Mond gas recovery plant, gas engines and dynamos, &c., cost, complete, £49,000. The running costs would be £11,381, less sale of bye-products £3937—net cost £7444. The cost per brake-horse-power-hour would be 0·149d., and per unit 0·222d.

Oil.

A paper on the suitability of the Diesel oil-engine for textile mill driving was read by Mr. Frank Carter, who stated that taking a weaving shed requiring 320 B.H.P., with oil at 50s. per ton, the capital cost (with rope-drive) would be £3565. The running cost, inclusive of capital charges, would be £913 per annum, or equal to 0·33d. per brake-horse-power-hour. For a spinning mill using 1000 H.P., with rope-drive, the capital cost would be £10,290. The running costs would be £2699 per annum, or equal to 0·26d. per brake-horse-power-hour. With electrical driving, the plant for the same weaving shed would cost £3804, and the running cost would be £904, or equivalent to 0·49d. per unit. The cost of the spinning-mill installation would be £11,570, and the running cost would be £2745 per annum, or equivalent to 0·39d. per unit.

He said that, in comparing various types of power plant, it was not sufficient to consider only the amount of fuel used by the prime mover. Allowance must be made for all auxiliaries—such as economizers, boiler-feed pumps, condensing plant, cost of water for condensing purposes, and stand-by losses in the case of steam plant. Also, in comparing the cost of repair and maintenance, the auxiliaries must be taken into account, as the repairs on these would probably amount to a sum considerably in excess of the repairs to the engine only, and, of course, the steam plant was not complete without such auxiliaries. Then an allowance should be made for the cost of cleaning boilers, economizers, and flues. Similarly, with gas plant, the stand-by losses and cost of water for scrubbers or gas cleaning and cooling plant must be taken into account, as well as repairs and maintenance on both gas plant and engine. Under local by-laws it was often compulsory that the effluent from the gas-cleaning plant should be filtered and deoderized before being turned into drains or waterways, so as to prevent pollution. The Diesel engine was a self-contained power plant, and no auxiliaries requiring attention by stokers or other labour were needed to enable the engine to drive the productive machinery. Consequently, the number of men engaged in the running of the plant could be reduced to a minimum. The Diesel engine could be guaranteed to give quite as good results as the most modern steam-engine as regarded steady turning; while as to reliability, he quoted the case of an engine installed some five years ago which had averaged 23½ hours out of every 24 hours during this period, and was regularly run for five and six weeks without a stop.

Figures obtained in electricity supply stations were given to show that the total works cost with Diesel engines was about one-half that of steam and gas plant, for powers up to 1000 H.P.

Electricity.

Dealing with electricity, Mr. J. F. Crowley said that the case for electricity rested broadly upon steadiness of drive, resulting in higher maintained speeds, increased production, and improved quality of material; and specific advantages resulting in still greater production and improvement in quality. Other advantages included flexibility, lighter and cheaper buildings, better utilization of building space, concentration of generating plant, improved illumination, and reduced risk of accident. For the driving of ring spinning frames, electricity possessed peculiar advantages.

FILTRATION OF NEW YORK'S WATER SUPPLY.

Rapid Method of Treating the Croton Water.

The purification of New York's water supply from the Croton Valley by a filtration plant of the rapid type—the largest in the world—was approved by a board of consulting engineers in a report recently submitted to the Department of Water Supply, Gas, and Electricity. This decision, approving the plans prepared by the Chief Engineer (Mr. I. M. De Varona) and the Consulting Engineer (Mr. George W. Fuller), under the general direction of the Commissioner (Mr. Henry S. Thompson), confirms the selection of rapid filters instead of those of the slow sand type operating at a rate of 10 million gallons per acre daily for which tentative plans were completed in 1907. The new plant has been designed to treat the combined flow of the new and the old Croton aqueducts, which averages slightly more than 300 million gallons daily. The site selected is in the easterly and unfinished section of the Jerome Park reservoir in the borough of the Bronx, directly west of the existing pumping-station.

The mechanical filtration plant, according to some particulars in "Engineering Record," comprises the following principal features: A house for preparing the chemicals; a mixing-chamber, where the coagulant will be applied to the Croton water; six covered settling-basins; 80 mechanical filter units; and a covered filtered water reservoir. The 80 filter-beds will have a net filtering area of 2·7 acres. The covered settling-basins will extend over 12 acres, and have a capacity of 88 million gallons. The filtered water reservoir, enclosed by groined arch vaulting, will hold 350 million gallons, and occupy a ground area of 55 acres. The time allowed for completing the work, after the contract has been signed, is three years.

The plans and specifications provide for six different types of filter equipment, the contractor to submit bids on any one or more: (1) With this type, the filters are washed with air and water, forced through separate systems. The positive head is used—*i.e.*, the head due to the depth of water above the bottom of the filter-tank. (2) This type is the same as the previous one, but provides for the use of a negative head—*i.e.*, the operating head would be the head in the tank *plus* such suction as might be created by lowering the water in the filtered water reservoir. (3) With this type, the filters are washed by water and air, but not through separate systems; only one strainer system will be provided for both water and air. Positive head is to be used. (4) This type is the same as the preceding one, but provides for negative head. (5) With this type, the washing is done by water alone at a comparatively high velocity. Positive head is used. (6) This system is identical with the preceding one, except that negative head is provided for.

After flowing through a Venturi meter, the aqueduct water will pass first through a gate chamber and thence to the mixing-chamber —a covered concrete reservoir having an area of about 0·9 acre, and provided with baffles, flushing-pipes, and drains. Its purpose is to thoroughly mix the chemicals with the water before reaching the settling-basins. The chamber is 517 ft. 6 in. long, and about 95 feet. wide. The roof is of the groined arch type, supported by circular piers spaced 12 ft. 8 in. on centres. The baffles—6-inch concrete walls—are the "round-the-end" type. The floor is of concrete, flat, 6 inches thick.

Five of the six covered settling-basins are for removing the heavier sediment from the water before it passes to the filters, and are provided with baffles. The other one is for removing the sediment from the wash-water, if required. All are provided with flushing-pipes and drains. The basins have a length of about 750 feet. The piers which support the groined arch roofing are spaced 18 feet.

The 80 filter units are arranged in groups of 20—ten on either side of four galleries. Each bed is 48 ft. 9 in. long inside, and is separated into two halves, each 14 ft. 9 in. wide, by a central wash-water gutter, into which 14 lateral gutters of concrete discharge. The filtering material will consist of at least 8 inches of gravel, placed in four layers, and 2 ft. 6 in. of sand. The rate controllers are to be of the Venturi type, each capable of maintaining a rate of flow from 2½ to 5½ million gallons daily.

The current issue of "Engineering" contains a description, illustrated by a number of photographs and plans, of the engines of the Nuremberg type which are being constructed by the Lilleshall Company, Limited, of Oakengates, for the railway power-station at Kamata, near Yokohama. The station is designed to accommodate four gas-engines, each rated at 2130 B.H.P., when running at 94 revolutions per minute. The producers have been supplied by the Power-Gas Corporation, of Stockton-on-Tees, and are located at the side of the building. The important part that sulphate of ammonia plays as a manure in agriculture formed one of the main reasons in deciding the Japanese Government to instal a gas plant, and thus support their farmers without having recourse to foreign manures, over the price of which they had no control.

REGISTER OF PATENTS.

Manufacture of Liquid Illuminating Gas.

BLAUGAS PATENTGESELLSCHAFT, M.B.H., of Augsburg, Germany.

No. 18,936; Aug. 23, 1911. Convention date, Aug. 30, 1910.

In patent No. 23,675 of 1904, a process for the manufacture of liquid illuminating gas from gas mixtures containing hydrocarbons—such as oil gas, natural gas, and so forth—was described, consisting in compressing distillation gases while under the cooling action of water to such an extent that all their constituents capable of liquefying under such conditions are liquefied; and thereupon they are separated from the permanent gases in liquid form. This process, the patentees mention, in addition to utilizing the capacity for condensation of the constituents (the critical temperature of which is situated above the normal) which are gaseous at normal temperatures and atmospheric pressure, utilizes the gas-dissolving property of the readily volatile hydrocarbon constituents (such as benzine) which are in a liquid state at normal temperature and atmospheric pressure, which property increases with the pressure. The permanent gases not dissolved in the liquid gas separate out above the compressed and liquefied gas, and these permanent gases comprise in admixture another part of liquefiable gases.

Nevertheless this process, they continue, operates with relatively small loss in liquefiable constituents; and these losses can be still further reduced by increasing the compression pressure or adding to the compressed crude gas a certain additional quantity of readily volatile gas-dissolving hydrocarbons, or by conducting the permanent gases saturated with liquefiable gases under pressure through an absorption liquid in accordance with the counter-current principle, which for the greater part only dissolves the liquefiable gases. The dissolved gases are thereupon freed at suction conduit pressure by discharging the liquid saturated with gas and again drawn-in by the compressor with fresh crude gases and compressed.

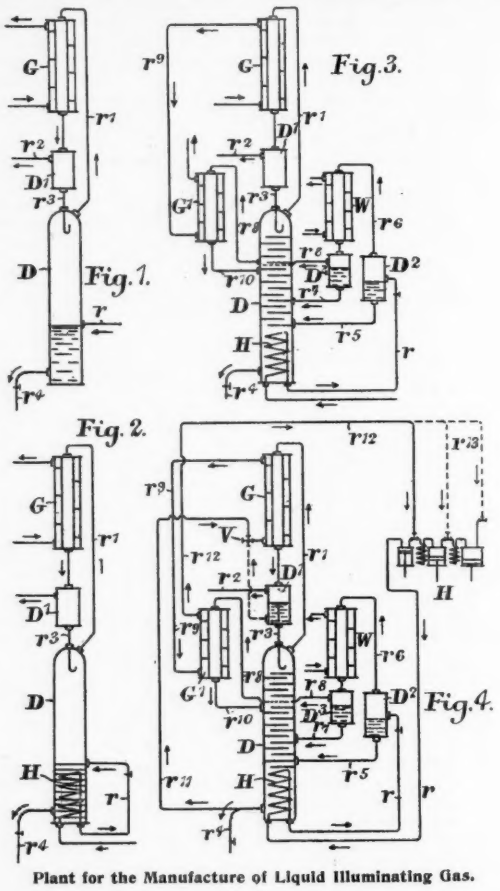
Experience in the practical employment of liquid illuminating gases manufactured in the manner described has, however, shown that it is not advisable to take up with the gas to be liquefied any part of the readily volatile liquid hydrocarbons contained in the crude gas or only small quantities of it, but to separate the greater part of the hydrocarbons from the crude gas prior to the liquefaction of the latter. This can be effected most readily and effectually by the process described in patent No. 2292 of 1909, in which the separation is effected at one of the first stages of the compression, simultaneously with water or artificial cooling. Nevertheless it has been found that as soon as the separation of the readily volatile liquid hydrocarbons is effected vigorously the manufacture in accordance with the process hitherto employed entails fresh losses or difficulties, and the total output of the plant is "very prejudicially affected."

Now, careful experiments have demonstrated that these facts are due to the following causes. Owing to the thorough separation of the readily volatile liquid hydrocarbons (25 to 30 per cent. by weight of the crude gas when heavy oil gas produced at a low temperature is employed), the constituents with gas-dissolving properties are withdrawn from the gas; the natural result being that the quantity of condensation products (liquid illuminating gas) obtained, owing to the compression and the water cooling, is reduced. This, however, is not only because the weight of the separated readily-volatile liquid hydrocarbons has to be deducted, but also because, in view of its absence in the liquid gas, those gaseous constituents which would otherwise have dissolved therein escape with the permanent gases. The partial pressure of these liquefiable gases is consequently correspondingly increased in the permanent gases separating above the liquid gases, and the total quantity of the permanent gases which are not dissolved increases in the like measure. In order to recover the liquefiable constituents from the permanent gases by absorption, in this case a correspondingly larger quantity of absorption liquid must be employed; and, in addition, during the elimination of the gas a larger quantity of gas is liberated and must again be compressed. Apart from the fact that, if the methods of manufacture employed were retained, it would be necessary to reckon with a very large volume of gases to be absorbed and absorption liquid constantly circulating through the apparatus, for which purpose a large expenditure of power would be necessary, it must also be remembered that the gases liberated from the liquid carry with them large quantities of vapours of the absorption liquid, because only readily volatile hydrocarbons—such, for example, as separate from the crude gas itself by cooling or by compression—are suited for this purpose. It is true that these can be separated without unduly complicating the process by the method described in patent No. 2292 of 1909 by the re-compression simultaneously with the hydrocarbons contained in the crude gas. Owing to the energetic separation of the crude gases, however, as already stated, a larger quantity of gas to be absorbed is caused to circulate in the process, and, furthermore, the quantity of the vapours of the absorption liquid re-separating from these gases during the compression increases, and its re-admixture with the crude gases acts directly counter to the object in view.

The present invention relates to a method of, and apparatus for, manufacturing liquid illuminating gas in which the difficulties referred to above are eliminated, owing to the fact that the extraction of the liquefiable constituents from the permanent gases is effected by artificial cooling—that is, otherwise than in the ordinary manner by atmospheric air or ordinary water—instead of by the absorption process. In accordance with this method, gases that are not liquefied by pressure at approximately normal temperatures are subjected, while under heavy pressure, to artificial cooling to a temperature of $-50°$ C. or under, at which the maximum quantity of liquefiable constituents of the gas is separated from the permanent gases in liquid form.

The temperature attained by the artificial cooling differs according to the pressure used and to the composition of the mixture to be treated; such composition being different according to the method of manufacturing the mixture. Supposing that the pressure used for liquefying the gases is 50 at., which pressure is only a little below the critical pressure of the gases to be treated and which pressure should not be exceeded to work below the limit of continuity of the liquid and gaseous state, so that the separation of the liquid and gaseous constituents is very easily made, then the final temperature of the mixture cooled by the artificial cooling should be at least $-85°$ C. At this temperature the so-termed permanent constituents of the mixture begin to separate out in a liquid state. In the neighbourhood of this temperature the remainder of the liquefiable gases (ethylene and ethane) separate out in a liquid state, because the point of ebullition or condensation of a mixture of two soluble substances is directly in proportion to the two substances contained in the mixture. For instance, the point of condensation of a mixture of ethylene and methane in which only a small percentage of ethylene is contained is situated in the closest proximity of the point of condensation of the methane—that is, under 50 at. pressure a temperature of $-85°$ C. From such a mixture ethylene can be wholly separated if the final temperature of the mixture to be cooled under a pressure of 50 at. is the point of condensation of methane and if this temperature is maintained during the separation process. A small part of the methane is liquefied only in this part of the apparatus in which the lowest temperature is attained. Because such gas is not obtained as a liquid product of the process, but only in assuming a liquid state gives off the remainder of coercible gases then remaining in a liquid state, the liquid methane is re-conducted to that part of the apparatus in which is a higher temperature, so that it is brought again to a gaseous state.

As shown in fig. 1, the crude gases freed from such hydrocarbons—as benzine, which are in a liquid state at normal atmospheric pressure and temperature and compressed—are first of all conducted into a separating vessel D, in which the liquefied constituents of the gas which have already been liquefied by compression and water cooling



Plant for the Manufacture of Liquid Illuminating Gas.

at normal temperature or at the temperature of the cooling water are separated, while the gases situated above the liquid, which are, however, still saturated with liquefiable gases, are alone subjected to very rigorous artificial cooling, whereby the liquefiable constituents separate in the form of liquid. With this object, these gases are conducted out of the vessel D through the pipe r^1 into the cooler G, constructed on the counter-current principle, and then into the separating vessel D^1, where the aggregate liquefied by the artificial cooling separates from the permanently remaining gases. The latter are thereupon carried off through the conduit r^2, while the condensate flows back into the separating vessel D through the pipe r^3 provided with a hydraulic seal. In accordance with the partial pressures of the liquefiable and permanent gases in the original mixture and with the condensation temperature attained and with the pressure prevailing, the condensate in the vessel D^1 contains a larger or smaller quantity of permanent gases (dissolved), which, however, escape from the liquid in the form of vapour when it comes into contact with the liquid already contained in the vessel D, of considerably higher (normal) temperature. The consequence is that the liquid gas in D experiences a cooling which progresses with the condensation process in G. This increases its capacity for dissolving permanent gases; and it has been found that when the gas cooled below the normal temperature is conducted directly from D through r^4 into the transportation vessels (in which operation it assumes the normal temperature), the homogeneity of its liquid aggregate condition is impaired and it partly resumes the gaseous form, thus preventing the transportation vessels from being filled with the necessary full weight. This can be avoided, however, by pre-

viously supplying to the liquid gas in the lower part of the vessel D sufficient heat to drive out the permanent gases dissolved therein, and heat the liquid gas itself to the normal, or somewhat above normal, temperature. The heat can be supplied from any convenient source of heat or by conducting the gas to be liquefied in a superheated condition, such as would be given to it by the compression without simultaneous water cooling, through a heating coil H inserted in the lower part of the vessel D (fig. 2). In accordance with the opportunity given to the compressed gas of yielding up its compression heat in H, it liquefies, and is then introduced into the vessel D for further treatment, as already described.

It is advantageous to increase the efficiency of the separation apparatus D by forming it as a rectification column (fig. 3) by providing it with insertions which impede circulation of the liquid and gases inside the vessel and only enable the condensate to effect a stratified travel in the downward direction while enabling the gases to ascend. In this method of superposing the light upon the heavy strata of liquid and gas in layers, it is also advantageous that the mixture coming from the heating coil H should not introduce into the column gases which have already been liquefied and those still in gaseous form. With this object, one or more separating vessels D^2 D^3 are arranged in front of the column for the separation of the liquid aggregate from the gaseous aggregate. In order to prevent the rectification process proceeding in the column from being impaired, the liquid is conducted from D^2, for example, through r^5, and introduced at a part of the column at which the gas mixture in the column itself has the same temperature and composition as the liquid introduced from D^2. The gases located above the liquid in D^2 are conducted through r^6 into a cooler W and cooled to the cooling water temperature of + 10° C. Consequently, here again a further portion of the gas is separated in liquid form, and collects in D^3 below the unliquefied gases simultaneously coming from W. Of course, the composition of this liquid is different from that obtained at a higher temperature from the still heavier gases in D^2; and the condensate obtained from D^3 is lighter, and comprises a higher percentage of permanent gases in solution. Consequently, it is then introduced through r^7 into the column at a higher level than that obtained from D^2. The gases not separated in liquid form in D^3 are conducted from there through r^8 into the counter-current cooler G^1, where (if necessary) they are again cooled; the cooling medium which has already acted at a lower temperature in the apparatus G being conducted through r^9 into G^1 and again utilized. The gases which are cooled in G^1 substantially below cooling water temperature, and partially liquefied, are then conducted through r^{10} to a part of the column situated above that selected for the condensate from D^3.

An important point in carrying the process into practice, it is said, is the selection of a suitable cooling medium for the gases conducted through the counter-current apparatus G and G^1 for the purpose of cooling them to their condensation point. For this purpose, owing to the low temperatures then existing, only a compressed gas which is allowed to flow out again at a low pressure can be utilized. Now in view of carrying out the process in the most rational manner, it is obvious that it would be desirable to utilize for this purpose the permanent gases passing under pressure from the decanting vessel D^1 through r^2 after they had been expanded. Such a method would approximately correspond to the method described in patent No. 12,390 of 1892, for the separation and recovery of easily volatile substances from air or other gas charged with the same. It has, however, been found that, on expanding, the quantity of cold supplied by these gases is far too small to produce a sufficient cooling to the necessary temperature and an adequate condensation of the liquefiable constituents contained in the mass of gas to be cooled.

On the contrary, a permanent condition occurs at a certain temperature at which the permanent gases taken from D^1 still contain a considerable percentage of liquefiable constituents, which are, therefore, not obtained in the liquid condition. Better results are, however, obtained by a modified method of carrying the process in practice, in accordance with which a portion of the gas already liquefied is used as the cooling agent. It can be taken from the lower part of the column D through r^4 and supplied through r^{11} (if desired after cooling) to the throttle valve V (fig. 4) and the counter-current apparatus G G^1, where it expands to the pressure of the suction pipe of the compressor K. Owing to the relatively large amount of cold supplied, temperatures of − 100° C. can be attained when the liquid gas has been completely freed prior to the treatment in the column from the liquid (carburetting) hydrocarbons, such as benzine and the like. A still lower temperature is attained when the liquid gas, which mainly consists of ethylene, is taken from a higher part of the apparatus where it still holds considerable quantities of methane and a small percentage of hydrogen in solution. However, the attainment of such lower temperatures hardly exerts an important influence on the practical separation effect in carefully constructed columns. There is, however, a further advantage in the employment of liquid gas obtained in the process itself as the cooling agent, because it is not necessary to allow it to vaporize under suction conduit pressure but under the first or lower stage pressures of the compressor K. Thus the gas vaporized under the second stage pressure can be drawn through r^{12} and re-compressed. With this arrangement, contrary to what is the case described above (where the cooling medium is vaporized at suction conduit pressure and must again be drawn through r^{13}), the output of the compressor is not diminished, and the recompression of the gas employed as the cooling agent is obtained with a smaller expenditure of power.

When the evaporated cooling medium is supplied to the suction conduit of the first stage of the compressor, the compressor naturally draws in so much less fresh gas in proportion as evaporated cooling medium has been supplied to it, as its total suction capacity is constant. When, on the other hand, the evaporated cooling medium is not supplied to the suction conduit of the first stage of the compressor but to that of a later stage, the supply of cold remains the same, while the consumption of power diminishes and the cooling medium subsequently introduced is added to the quantity of fresh gas sucked in by the first stage of the compressor as before, and which remains substantially unaltered, so that the volumetric output is increased.

As pointed out above, the applicant is well aware that a process has been proposed for the separation and recovery of easily volatile substances from air or other gas charged with the same, which process consists in compressing such air or gas at from 2 to 6 at. and cooling the compressed gas up to − 50° C. by the formerly compressed gas cooled up to − 80° C. From this known process applicant's process for the manufacture of liquid illuminating gas differs in that much stronger pressure is used and that the gas under such pressure is cooled to − 50° C. or under—preferably to − 85° C. For such cooling, compressed gases in a gaseous state are not used as in the older process, but gases already liquefied.

Gas-Stoves.

DRIESSCHE, L. VAN DEN, of Brussels.

No. 19,974; Sept. 7. 1911.

This invention relates to gas-stoves of the kind in which a perforated mantle or a series of superposed mantles cover the burner, and in connection with which air-heating radiators are used, through which the air circulates "without contamination by the combustion gases."

The invention comprises: The combination of a perforated mantle composed of one or several perforated concentrically superposed casings covering the burner; a laterally perforated bell adapted to be placed over the mantle and to be rapidly heated to incandescence (the distance between the bell and the mantle being sufficient to enable the combustion gases discharged from the perforations of the mantle to rise into the upper part of the chamber between the bell and the mantle); a disc to support the bell and mantle, and provided with openings to admit air for combustion; and one or more conduits in the top of the bell connected at their upper ends to air-heating casings, whence the gases escape into a chimney after transmitting their heat to the surfaces of the air-heating casings.

Three constructions according to the invention are illustrated in the drawings accompanying the specification.

Gas-Producers.

KERPELY, A. VON, of Vienna.

No. 20,633; Sept. 18, 1911.

This invention relates to rotary-grate gas-producers of the kind in which a rotating pan arranged at the bottom of a stationary shaft carries the rotary grate which is formed with blow-holes for the air. The rotary pan is provided with a water-seal for "sealing" the shaft—that is to say, for preventing the gas generated and the air blown in escaping at the bottom of the shaft, though the ashes may without difficulty be discharged through the water.

These known arrangements, the patentee points out, give an excellent effect when pressures are used which do not much exceed the atmospheric pressure; but if higher pressures are to be employed in producers, the water-seal arrangements hitherto used prove insufficient, especially with respect to the ash discharge. This will, he says, be readily conceived from the fact that the pan must have a considerable height, as the water on the outside will rise to a point corresponding to the pressure within the shaft. Of course, a pan of this kind renders a continuous discharge of the ashes very difficult or even impossible; the discharge of the ashes out of the pan requiring a reduction of the pressure and thereby decreasing the output of the producer and interfering with its regular and efficient working.

In another known arrangement used previously to the before-mentioned arrangements, no water-seal is employed; the shaft terminating in a closed chamber in alignment with it, into which the ashes are directly discharged and from which they are removed from time to time through an opening controlled by a door or flap—a rotary flat plate being arranged within the chamber below the shaft, and a fixed scraper being provided to remove ashes from the plate. Such an arrangement, however, presents the well-known serious disadvantages which led to the construction of water-sealed shafts; the chamber beneath the shaft being filled very rapidly, and thus no complete combustion of the fuel taking place, when no special means are provided for preventing this filling. Moreover, the means usually provided for the purpose—namely, the provision of a deep bed of non-combustible material under the fuel or the like—have not proved very effective.

Now the present invention has for its object to remove the difficulties arising in connection with the high-pressure blast, without altering the mode of discharging the ashes used in water-seal arrangements, in which the ashes have to pass underneath the shaft through the rotating pan in which they accumulate on the outside—being discharged continuously from it over its outer upper edge by means of an abutment surface or plate and a covering scoop. Accordingly, the water-seal is dispensed with; the rotary pan being housed in an air-tight chamber which prevents any communication with the outer atmosphere. The discharge of the ashes out of the shaft is in this way left unaltered—being continuously effected from the producer into the chamber, which, for the purpose of discharging the ashes from itself, is adapted to be placed temporarily in communication with an ash pit through an ash passage provided at the point of discharge, and adapted to be closed in an air-tight manner. The ash pit is likewise adapted to be closed in an air-tight manner.

Proposed Increase in Miners' Wages.—At a conference of representatives of employers and workmen on the Conciliation Board for the federated area, to consider an application by the miners for an advance of 5 per cent, in wages, it was decided to submit to the employers and workmen in the district proposals which, if adopted, will mean that the 5 per cent. which was taken off the men's wages in 1909 will be restored. After the opinion of those concerned has been obtained, the conference will meet again. The federated districts to which the proposed agreement applies are Yorkshire, Cleveland, Lancashire and Cheshire, the Midland Federation (Staffordshire, Warwickshire, Shropshire, and Worcestershire), Derbyshire, Notts, Leicestershire, South Derbyshire, North Wales, Cumberland, Bristol, Somerset, and the Forest of Dean.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Depreciation and Income-Tax.

SIR,—I am desired through the medium of the "JOURNAL" to advise those gas companies who have expressed their conditional acceptance of the draft scheme prepared by my Committee that the scheme has now been finally settled and approved by the Board of Inland Revenue, and, in the form as per copy sent herewith, will be circulated by the Inland Revenue Authorities to their Surveyors for acceptance by any company so desiring.

My Committee desire to tender their thanks for the very great support they have received from all parts of the country.

At a final meeting of the Committee, the following resolution was passed: "That the Committee approve the scheme as amended and approved by the Board of Inland Revenue, and recommend the same for adoption by the Gas Companies of the United Kingdom."

H. E. IBBS,
Secretary to the Committee appointed at a Conference of Gas Companies, Jan. 2, 1912.

London, S.W., Sept. 20, 1912.

The Scheme.

GAS UNDERTAKINGS OTHER THAN THOSE OWNED BY MUNICIPAL OR OTHER PUBLIC AUTHORITIES.

DEPRECIATION.

SCHEME FOR DETERMINING THE INCOME-TAX ALLOWANCES TO BE GRANTED FOR WEAR AND TEAR AND MAINTENANCE.

PLANT, MACHINERY, AND MAINS.

1.—No depreciation shall be allowed in respect of the plant, machinery, and mains, other than as specified hereinafter; but in lieu thereof all expenditure on repairs and renewals is to be charged in the company's accounts for income-tax purposes and allowed as working expenses, as and when incurred. All expenditure on extensions and improvements, where debited against revenue, to be distinguished and excluded from the said allowances.

2.—Provided that whenever any expenditure on such renewals is incurred, and full effect cannot be given to its deduction in the year when incurred, owing to the profits or gains chargeable with income-tax in such year being less than the amount so expended, the balance of the said expenditure, which has not been allowed, may be carried forward and allowed in the following year or years, as is provided in the case of unallowed wear and tear by section 26 (3) of the Finance Act, 1907.

GASHOLDERS.

3.—In addition to repairs, depreciation shall be allowed at the rate of 3 per cent. per annum on the written-down value. Such value not to include tanks, except where constructed of steel or iron, and in no case is the cost of excavation to be included in the value upon which the depreciation allowance is computed.

METERS (ORDINARY AND PREPAYMENT), COOKERS, AND GAS-FIRES.

4.—In addition to repairs, allowance for depreciation shall be granted at the rate of 10 per cent. per annum on the written-down value.

SERVICES AND FITTINGS.

5.—No depreciation shall be allowed in respect of services and fittings; but in lieu thereof all expenditure shall be allowed as a trading expense as and when incurred.

"Services" are to be understood as representing the pipes which connect the street mains with the properties served.

"Fittings" are the pipes, pendants, and brackets within such properties, supplied at the cost of the company.

Where fittings so supplied are removed by the company at any time, they shall be brought back into stock, if of any value, and re-issued without any charge against revenue except for the cost of repairs necessary to enable them to be re-issued. In the event of their not being re-issued, revenue shall be credited with the scrap value.

GENERAL.

6.—In all cases where depreciation allowances are granted, renewals, if charged against revenue, shall be carefully distinguished and notified to the surveyor in order that they may be added back to profits for the purpose of arriving at the income-tax liability.

7.—If new works are erected, wholly or partially, on a new site, in place of old works abandoned or demolished, a reasonable allowance shall be granted for renewals in respect of the displaced plant, so far as it is actually renewed, such allowance to have regard to the original cost of the displaced plant, less any depreciation that may have been granted, but such allowance shall not include the cost of preparing the new site or erecting foundations for the new plant.

8.—All renewals of parts which do not destroy the identity of the original article shall be allowed as repairs, except so far as they constitute an extension, enlargement, or other similar improvement in value.

9.—Where renewals are allowable under this scheme in lieu of depreciation, they shall be allowed notwithstanding that the cost thereof may not have been debited in the company's accounts against revenue.

10.—"Written-down value" means original prime cost, *plus* subsequent additions (including renewals which have not been allowed for income-tax purposes), less all allowances actually granted for income-tax purposes in past years in respect of depreciation.

11.—"Expenditure" includes the sum expended on materials, labour, and incidentals.

12.—This scheme shall take effect for the year 1912-13 and future years, and for years preceding where claims of depreciation are now awaiting settlement.

13.—Where, in any case, allowances for depreciation have been made which are now to be discontinued, and they have not been exhausted by renewals already effected, the amount of such unexhausted allowances shall be deducted from the expenditure on future renewals as and when they are effected.

Attached to the document is the following form for signature:

We desire to adopt the above arrangement, and hereby undertake to fulfil the conditions thereof.

On behalf of _____

_____ *Chairman.*

_____ *Secretary.*

Dated the _____ *day of* _____ *191* _____.

Flues or No Flues and Escaping Heat Units.

SIR,—It is naturally a source of gratification to us to find the interest that has been, and is being, taken in our "Shadowgraph" method of testing the hygienic efficiency of gas-fires, and the ready manner in which the standard we have set up—namely, that a fire giving its maximum radiant efficiency should be able to pass the whole of its products through its flue, unaided by chimney draught—has been accepted by so many well-known members of the gas profession.

Arising out of our claim for this standard of hygienic efficiency, we were considerably surprised to read, in the article entitled "Messrs. John Wright and Co.'s Novelties," on p. 619 of your issue of Sept. 3, the contention of our esteemed competitors that "a fire that carries off all its products without being attached to a flue, will, when the ordinary chimney draught comes into play, inevitably carry off more than the products—to wit, an unnecessary number of heat units as well."

Your editorial comments in the same issue dealt ably with this statement; and with these comments we are in complete accord. In these days of applied science, we regard such a statement as the one quoted above to be merely assumption or the result of careless consideration. May we, however, ask Messrs. John Wright and Co., in the general interests of the gas industry, to give the scientific evidence (if it be possible) to support their contention?

We hold (as the result of practical experiments) that, by the correct application of scientific principles, it is not only possible to construct a fire that will pass the whole of the products of combustion through its flue unaided by chimney draught, but will continue to give its maximum radiant efficiency when brought under the influence of an ordinary chimney draught. Moreover, such a series of fires has actually been placed upon the market.

We have no doubt that, in the interests of the gas industry as a whole, Messrs. John Wright and Co. will be willing to publish the reasons that evoked the views to which they have given expression, as quoted above.

THE DAVIS GAS STOVE COMPANY, LTD.

Queen Victoria Street, London, E.C., Sept. 21, 1912.

Alliance and Dublin Consumers' Gas Company.

SIR,—Owing to absence from home, my criticisms of the affairs of this Company have been temporarily suspended; but I propose to resume them shortly.

As, however, the belated accounts for the half year ended the 30th of June will be shortly issued, followed by the meeting of proprietors in Dublin, I shall delay further comment until afterwards, so as to give the Directors an opportunity of replying to my points, and explaining to the stockholders the position of the Company; also why the full standard dividends are not paid.

NONULUS.

Sept. 21, 1912.

A Praiseworthy Campaign.

SIR,—I beg to thank you for the appreciative references to my humble inventions, but should feel obliged if you would permit me to state that the stove and the cabinet were only exhibited and demonstrated with by me on the occasion of the "Poor Man's Dinner" to the Press in connection with Dr. Toogood's course of lectures on "Common-Sense Cookery" being given in the house of the Society of Medical Officers of Health. The statement that the Society exhibit the stove and the cabinet is inaccurate; and I should feel obliged if you would be good enough to publish this explanation in your next issue.

WILLIAM A. LAWTON,
Executive Secretary.

1, *Upper Montague Street, W.C., Sept.* 17, 1912.

Products of Carbonization and Coke Used as Fuel.

SIR,—I think that the value of results like those supplied by Mr. W. Blair on p. 701 of the "JOURNAL" for Sept. 10 would be much enhanced if supplemented by the weight of coke, and the weight or number of gallons of tar and *condensed* liquor *made* per ton of coal, or such information that one can arrive at the number of pounds *recovered* from each 2240 lbs. carbonized.

In Mr. Blair's tabulated statement, the coke used as fuel per 100 lbs. of coal carbonized is stated to be 17 p.c. and 29·5 p.c. If the "p.c." means per cent., is it the percentage of the coke *made* that is used?

STUDENT.

Bristol, Sept. 15, 1912.

LEGAL INTELLIGENCE.

CHARGE OF DISCONNECTING A METER.

The Ilfracombe Gas Company preferred charges on Monday of last week at the local Police Court against a consumer named James Bowker, a retired coachbuilder, of disconnecting his meter from the supply pipe within the past six months, and of hindering an officer of the Company entering the house to inspect the meter on July 16.

Mr. C. E. R. CHANTER, prosecuting for the Company, quoted parts of the Gas-Works Clauses Act which imposed penalties up to 40s. for disconnecting the meter, and up to £5 for hindering a Company's officer. Bowker, he said, had a gas supply through a prepayment meter, and by disconnecting the meter the occupant of a house might bye-pass, or short-circuit, the supply, so that gas might be used without being registered. Defendant had a cooker, gas-ring, gas-fire, and sundry lights. On July 16, the Company's inspector was kept an unnecessary time outside the door, which would give the occupant the chance of re-connecting the meter and putting the gas appliances in order. In November last, Mr. Snashull, one of the officers of the Company, found gas escaping at the house from the unions between the meter and the main. The unions were loose, and he tightened them. On June 26, he tried the unions again, and they were then slack. On July 16, he made a special visit, taking another gas man. After knocking at the door without gaining admission, he opened it, and found the inner door locked. He knocked at the inner door, and Bowker from inside said his wife had gone out and taken the key—adding that the visitors could either wait while he got a key or go round by the back way. Snashull went round; the time occupied from his knocking at the front door to his entering the house being six or seven minutes. He found the unions at the meter quite tight, and tested the cooker. The burner went out after being alight about twenty seconds, and Snashull accused the defendant of having disconnected the meter, and sent for Mr. J. Armstrong, the Gas Manager, who made tests. Defendant admitted having disconnected the cooker.

Mr. SELDON, for the defendant, objected to the suggestion of obtaining gas by fraud, which the prosecution were bringing against defendant, though they had not the courage to charge him with this offence under the section which provided penalties for it.

Mr. CHANTER said he did not charge defendant with fraud.

Mr. *Maurice Snashull*, foreman fitter and meter inspector, stated that he accused defendant of disconnecting the meter, and Bowker did not say he had not done so, but observed that he had the cooker disconnected to do some limewashing behind. There was some limewashing there.

Mr. *J. Armstrong*, the Manager of the Gas-Works, stated that from what Snashull found there must have been air in the meter, and there was only one way by which it could get there—by the meter being disconnected. Witness was suspicious of the small amount of gas used by the defendant; and the inspector was sent to trap him.

Mr. *H. D. Madden*, the Chief Engineer of the Cardiff Gas Company, said that, after hearing the evidence, he was of opinion that the meter had been previously opened and became charged with air.

Mr. SELDON, in defence, remarked that a mean crime was imputed against a man who had a perfectly honourable record, and the charge rested on the evidence of Snashull. He contended that Snashull's evidence, when he said that the gas was lighted and went out, was untrue. The gas was turned off overnight at the meter, and defendant had disconnected the cooker to clean the wall behind. The gas had been lit upstairs while it was still turned off at the meter, and so the gas in the pipe was exhausted. This was the reason it would not light. Defendant a year ago disconnected the meter to get a penny out which had stuck, and this was the only time the meter had been disconnected.

Defendant on oath denied having tampered with the meter, and said the gas bill was low because he had been using oil. He did not hear Snashull at the door, because he was in the garden.

Mrs. *Bowker* said she had never tampered with the meter except to get out a penny which had stuck twelve months ago.

A majority of the Magistrates were of opinion that the case had not been proved, and the summons was dismissed.

Sedgley Gas Profits.—The Gas Committee presented a report at last week's meeting of the Sedgley Urban District Council on the working of the undertaking for the year ended March last. It was stated that the gross profits, amounting to £2979, constituted a record; being over £1000 in excess of those for any previous year. After deducting sums for repayment of loan and interest, a net profit of £1599 was realized. The preparation of a scheme for extending the works was under consideration, and as soon as completed would be laid before the Council. The comparative figures appended to the report showed that the total revenue was £7606, against £7077 for the previons year; while the costs of manufacture and distribution showed a considerable decrease—the total being £4626, compared with £5101 for 1911.

Rhymney and Aber Valley Company's Extensions.—It is stated that the Rhymney and Aber Valley Gas and Water Company are spending between £15,000 and £20,000 on their new gas-works at Caerphilly. It is their intention eventually to erect works large enough to supply the Rhymney Valley and Caerphilly, Aber Valley, and Bedwas districts, and the present expenditure is initiatory to this end. At present Caerphilly and Aber Valley are supplied with gas from Bargoed and Hengoed. The site of the new works is in Mill Road, Caerphilly, on which a three-lift holder has already been erected. Other works now being proceeded with are a purifying house, water-gas plant, exhauster-house, boiler-house, and meter-house. Next year further expenditure will be devoted to the putting in of retorts, &c. During the past five years the Company have laid 60 miles of new gas and water mains.

MISCELLANEOUS NEWS.

GLASGOW AND SMOKE ABATEMENT.

Second Exhibition.

The second exhibition promoted by the Corporation of Glasgow for the purpose of showing how the pollution of the atmosphere may be mitigated by the use of smokeless appliances for cooking, heating, &c., was opened on Friday afternoon, in the Zoo Buildings, New City Road. The previous exhibition, held two years ago, attracted in three weeks nearly 80,000 visitors; and it is hoped that the present one may be even more successful. To popularize the use of gas, the Corporation are now fitting cookers free of charge; and recently they have undertaken to supply gas-fires on the hire or hire-purchase system. Since last June, the Gas Department have been installing these fires at the rate of 3000 a month. In the present exhibition there are 66 exhibitors; and the lighting is partly by high-pressure gas and partly by electricity. It will remain open for three weeks; and the programme includes a series of competitions for girls in cooking by gas and electrical appliances. Cookery lectures and demonstrations will be given three times daily by Miss E. M. Dods and Mr. William Kerr. The organization of the enterprise has been in the hands of a Committee of the Corporation, with the Lord Provost, Bailie Paxton, as Convener; while the several sections have been in the charge of the following officials: Mr. Peter Fyfe, Sanitary Inspector (Smokeless Fuel); Mr. Alexander Wilson, Gas Engineer (Gas Section); Mr. W. W. Lackie, Chief Electrician (Electricity Section); and Mr. S. B. Langlands, Inspector of Lighting (Lighting Section). The management has again been entrusted to Mr. James M. Freer.

In declaring the exhibition open, Sir Archibald M'Innes Shaw said he was quite satisfied it would be of great value, not only to the people of Glasgow, but to those of the surrounding districts. There were two competing sections in connection with the exhibition—electricity and gas. It was a good thing to have healthy competition. The Gas Department would tell them, of course, that there was nothing like gas—that it was the cheapest means of heating and the best method of cooking. The Electricity Department would tell them the same. But the Corporation, who were responsible for both, gave them their choice. He thought the Corporation were to be congratulated on moving in the direction they were doing, because were it not for them it would be impossible to get such an exhibition together. He therefore wished them all success in the venture which they had promoted, and expressed the hope that in the course—let him say—of ten years Glasgow would be entirely clear of black smoke and fog.

Bailie Paxton, in proposing a vote of thanks to Sir Archibald M'Innes Shaw, said that the Gas Committee and the Electricity Committee were both doing a great deal of splendid work in the way of trying to induce the citizens to adopt gas and electricity instead of coal; and it was of the utmost importance that their advice should be followed. The Gas Committee of this year were paying £75,000 more for the coal they were going to use; but they were able to sell gas at the same price as last year. If the somewhat extraordinary increase in the price of coal had not taken place, they would have been able to reduce the cost by at least 2d. per 1000 cubic feet. Since the first day of March—the day on which they introduced free cookers to the citizens of Glasgow and to the whole of the city gas area—they had given out no less than 36,000 cookers free to consumers.

A handsome and conspicuous stand is that of the Glasgow Corporation Gas Department, which occupies a site just opposite the main entrance, and covers a space of 70 ft. by 15 ft. The stand is divided into five compartments, representing a kitchen, dining-room, bath-room, shop window, and a stall for the exhibition of the many gas appliances shown by the department. The kitchen has been fitted up with two "Glasgow" cookers, similar to those lent by the department to householders, and also with a "Deighton" range—an ingenious and convenient arrangement of gas-oven and hotplate (manufactured by Messrs. Wilsons and Mathiesons), which takes the place of the usual kitchen coal-range. Hot water for use both in the kitchen and bath-room is provided by gas circulating boilers. Three of these circulators are shown, made respectively by the Davis Gas-Stove Company, Messrs. John Wright and Co., and Messrs. Wilsons and Mathiesons. A gas-fire is fitted below the oven in the "Deighton" range for heat when the kitchen is used as a sitting-room. Other appliances shown include a gas wash-house boiler, a clothes dryer, and gas-heated irons. Demonstrations of the uses of all the appliances will be given during the run of the exhibition by the lady attendants from the show-rooms in Sauchiehall Street.

The dining-room, which is handsomely panelled in Austrian oak, is provided with two fireplaces, in one of which a "St. Nicholas" fire, made by Messrs. R. & A. Main, is fitted, and in the other one of the latest gas-fires made by Messrs. John Wright and Co. These appliances show how an existing grate can be adapted for a gas-fire, and also how a new house should be fitted in the most approved way. In this apartment the lighting arrangements are a special feature. There are handsome pendants and candle-brackets manufactured by Messrs. James Milne and Son; while on the mantelpieces there are figures carrying small lights—the figures being on loan from Messrs. Falk, Stadelmann, and Co. Automatic switches show how the burners can be lighted and extinguished from any part of the room.

In the bath-room the advantage of the use of gas for water heating is shown. Among other appliances exhibited is the "Victor" geyser by Messrs. Ewart, and also a new type—the Parkinson Stove Company's "Hydrotherm"—in which the simple action of turning on the water at the tap causes the gas to light up, providing an instantaneous and ample supply of hot water. A Wilsons and Mathiesons' circulator similar to that connected in the kitchen is also fitted. Two very convenient adjuncts suitable for domestic use or for hairdressers' premises are fitted up on the washhand basin—the Parkinson "Pearl" geyser, equipped with hot spray, and the Fletcher-Russell "Horizontal" water-heater. The gas-heated towel rail only requires for its effective use

about a pennyworth of gas for 20 hours. The "Holophane" ceiling fitting sheds a soft and pleasing light over the room.

The shop-window section of the stand illustrates two methods of effective lighting. The interior lighting is shaded from the observer while illuminating the goods very efficiently, and the exterior lighting consists of a high-power lamp fitted with a parabolic shade.

In the show stall there are exhibited a large number of appliances illustrating the wide and varied uses to which gas can now be put. Radiators of several designs, and by all the principal makers, are shown. There are also new designs of art metal work radiators, the luminous tubes of which are made of "Vitreosil." Messrs. G. Hands and Co. are the makers; and a large variety is displayed. Gas-fires of many designs and sizes, finished in Berlin black, armour bright, and in coloured enamels of a tone to harmonize with any scheme of decoration, are shown in great variety. All of these fires can be obtained by purchase, and most of them by hire-purchase or on simple hire.

For kitchen use there are shown various sizes and kinds of cooking appliances now let out free by the Corporation, and also bake plates in large sizes suitable for bakers and confectioners, and smaller sizes for domestic use. There are fish-fryers, large grills, water-boilers, grill and toaster specially designed to meet the needs of those who require large quantities of toast quickly made, gas-irons, gas fire-lighters, gas-heated water circulators. The workshop appliances are numerous, and include quick-heating glue pot, ladle furnace, combustion furnace, tinsmith's stove, gas-forge, shoemaker's toolheater, dentist's plate dryer and heater, self-heating soldering bolt, jeweller's and dentist's blowpipes, large blowpipes for general work, and tailor's iron heater with automatic cut-off. As the area of the stand is limited, the exhibit will be changed frequently during the run of the exhibition.

Among other stands, the Carron Company make a fine display of their gas cooking and heating stoves, radiators, &c.; and the Corporation Electricity Department have an extensive show of electric lighting, heating, and cooking appliances.

WILLIAM MURDOCH'S BIRTHPLACE.

A Bust Unveiled.

During the proceedings at the recent annual meeting of the North British Association of Gas Managers, it was resolved that a memorial tablet should be erected upon the house at Lugar in which William Murdoch was born; and, in seconding the motion, Mr. J. W. Napier, of Alloa, remarked that recently, while taking a holiday in Ayrshire, he visited Murdoch's birthplace, and was more than astonished to find that no mark whatever was on the house in which he was born. The village of Lugar, he added, at present contained no memorial of Murdoch; but a movement had recently been instituted whereby it was hoped a bust would be placed in the hall of the village. This, we are pleased to note, has now been done; and it is further gratifying to reflect that the gas industry will have a share in memorializing Murdoch at the place of his birth when the North British Association put up their tablet. The bust which was unveiled in the Village Institute on Friday, the 13th inst., is a replica of the famous Chantrey bust in the Watt Museum, Birmingham, and is the gift of Mr. D. B. Murdoch, of the Hawaiian Islands; and the unveiling ceremony was performed by Mr. R. B. Murdoch, of Brookfield, a brother of the donor. These gentlemen, it may be remarked, are in no way related to the inventor, but are enthusiastic in the interests of their illustrious namesake. Additional interest was lent to the occasion by a lecture which was delivered by Mr. R. H. Kirkton, the Curator of the Watt Museum, on "Boulton, Watt, and Murdoch." A large audience was presided over by Mr. Dugald Baird, of Cumnock.

The Chairman, in opening the proceedings, said that his first duty was to thank the Committee for asking him to preside at such an important gathering, because it was undeniably a notable occasion when they were met together to do honour to the memory of one whose name had brought fame to their countryside. It gave him great pleasure to be associated with the two gentlemen who were to assist them that evening in celebrating the name of their illustrious son, who had brought honour and renown to their very doors. It was not to their credit that such a long period had elapsed before anything had been done to commemorate the name of William Murdoch. It was not that they did not recognize his worth, however, for, on innumerable occasions, at social and public gatherings, claims had been advanced for the recognition of the inventor's greatness. They were now to have presented to them a bust of their hero, and at no distant date they hoped to see the tablet which the North British Association of Gas Managers had promised to put in the wall at Bello Mill. In a short time they would be able to show to the world that they were not entirely lacking in appreciation of the genius who had been reared within a few hundred yards from where they were then sitting.

Mr. Kirkton, who was then called upon for his lecture, said he was present out of respect for his old friend, Mr. R. Barclay Murdoch. He did not come to Lugar as a complete stranger, however, for, when visiting the exhibition at Glasgow last year, he had made a pilgrimage to the birthplace of William Murdoch. The names of Murdoch, Watt, and Boulton were names which were held in reverence the world over. It was a remarkable thing that so many people seemed neither to know nor to care about the achievements of these men—achievements which had such far-reaching effects upon the progress of the world. A number of students from one of the large technical schools in Germany recently visited Birmingham, and in the course of things made a thorough inspection of the Watt Museum, which contains so many interesting relics. These students seemed to know more about the three inventors than many people who had lived all their lives within the four corners of the city which had sheltered Murdoch for so many years. Only a fortnight ago the Watt Museum was visited by a party of teachers from the secondary schools of Denmark, and most of those comprising the party had a very high opinion of, and a great reverence for, Murdoch of Bello Mill. The three men of whom he was to speak that evening were undoubtedly pioneers, and led the way and opened up avenues of thought and idea for many clever men who followed them. Personally, he had the greatest possible admiration for Murdoch. He was very glad to hear the Chairman's statement about the tablet to be erected at Bello Mill. The lecturer then proceeded to give a short and interesting account of the lives of the three inventors; and the lantern slides which accompanied his discourse gave an added interest to his remarks. The Watt room in the Museum with which he had the honour to be connected contained many interesting relics. In addition to a great number of drawings by James Watt himself, there was a large glass frame containing drawings by Murdoch. These were in splendid condition, and showed beautiful craftsmanship. In this room were also to be seen the original bust of Murdoch by Chantrey, a replica of which was to be unveiled later in the evening, in addition to busts of Boulton, Watt, and George Stephenson, the father of the locomotive. There were also large numbers of letter-books containing letters written by Murdoch regarding his inventions. The inventor was a voluminous letter-writer; and his letters are all perspicuous and explicit in style, while the handwriting is always legible. Some pictures of the old University of Glasgow were then shown; and the lecturer spoke of Watt's associations with that institution. When the inventor's fortunes were at rather a low ebb, he obtained an appointment as mathematical instrument maker to the University. He was thus enabled to pursue his inquiries and experiments without interruption, and became acquainted with many men of light and leading of that day. Several pictures relating to the work of Matthew Boulton were then shown. Boulton's chief trait was an insatiable desire for perfection. In managing his business, perfection and efficiency were his aims. Woe betide the unfortunate workman who turned out slipshod or imperfect work. To this desire for perfection might be attributed, in no small measure, the many improvements on existing machines which sprang from Boulton's fertile brain. One slide was a picture of the house in Birmingham where Murdoch lived during the years 1782 to 1798—years which were of outstanding interest so far as his work was concerned. It was during this period that the inventor made his first locomotive, and he fitted his house with a gas-lighting installation. It could only be regarded as a standing disgrace that this house, a building of such associations, had been allowed to go to rack and ruin. Many people, he said, were of opinion that Murdoch's genius was not sufficiently recognized in comparison with that of Watt. It was a notable fact that Murdoch's engine was simpler and less complicated than that of his contemporary, and indeed Watt ultimately adopted many ideas which were originated by Murdoch.

The Chairman called for a vote of thanks to the lecturer; and this was very heartily accorded.

Mr. Murdoch (who had been delayed on the journey to the meeting) was then introduced by Mr. Kirkton, and said that, on a previous visit to Lugar, he had been greatly grieved to learn that there was no memorial of any kind to William Murdoch. This was no longer the case, however; and he could truly say that he did not know a single Scotsman who was worthy of greater honour. Sir William Wallace, Sir Walter Scott, and Robert Burns were not more worthy of reverence and admiration than the inventor who was born at Bello Mill. [Amid great applause Mr. Murdoch then unveiled the bust.]

Mr. James Kilpatrick, in accepting the bust on behalf of the Trustees of the Institute, remarked that he hoped the youth of their community would find inspiration for the work of the world in the memory of William Murdoch. He asked Mr. Murdoch to convey to his brother the sincere gratitude of the people of Lugar,

Votes of thanks were accorded to Mr. Kirkton, the Chairman, and Mr. D. Bissett (who manipulated the lantern).

THE NEW SOUTH WALES GAS REGULATION BILL.

A Most Dishonest Measure.

Following up the reports given in last week's issue as to the Bill introduced into the State Legislature to regulate the operations of gas companies trading in this Colony (also the editorial reference to the matter on p. 743 *ante*), we to-day reproduce a leading article that appeared in the "Melbourne Argus" for Aug. 14.

Our contemporary says: The most dishonest measure ever presented to an Australian Parliament is the Bill to regulate the prices and the dividends of gas companies which the M'Gowen Ministry has introduced to the New South Wales Legislative Assembly. The knowledge that such a Ministry had in hand a Bill dealing with the subject caused an anticipatory fall of 30s. in Australian Gaslight Company shares; but even such an estimate as that, of the worst that seemed conceivable, fell ludicrously short of the reality, and since Friday, when the Bill was published, there has been a further drop of no less than 70s. For if the measure becomes law, the maximum dividend that any gas company will be allowed to pay will be 4 per cent.—that is to say, a lower rate of interest than the Municipality of Sydney has to pay on its loans, and an infinitely lower rate than the Government of New South Wales itself will have to pay in the future should this iniquity be perpetrated. For the thing is simple confiscation.

Parliament has a right, as well as the power, to take over such an undertaking as a gas manufacturing business, or to effect a transfer of the ownership and control of it to some other public body—provided it pays full compensation. But to ruin the undertaking by legislative means is confiscation pure and absolute. These companies are founded on Statute; and once it is realized that statutory protection may prove entirely illusory, that an unscrupulous majority may at any time—in a fit either of resentment or of mere wantonness—topple the whole thing to the ground, all sense of security will vanish. The M'Gowen Ministry contemplates, in a word, just such an act of perfidy as would have appealed to a corrupt South or Central American republic thirty or forty years ago—just such an act as ruined the credit of those countries beyond repair, and has cost them millions upon millions in interest on their loans. Such a precedent as would be created by the enactment of this amazing Bill would strike a deadly blow at Australian credit. It is known abroad that we are all one people, and it would be supposed that what one State would do might just as naturally be

expected from any or all of the others. From this point of view alone, then, the infamy of the act would scarcely be greater than the folly of it. The whole thing is obviously an electioneering dodge, designed in the most sordid way to catch the vote of the small consumer. It shows the lengths to which Socialist Governments will go to gain the support of the mob.

Holders of gas shares invested their money on the faith of a tenure which it probably never occurred to them to so much as question. It is understood that not one of the shareholders—some 1300 in number—of the Australian Gaslight Company, which is the oldest institution of its kind in the Commonwealth, is an original holder. A few of them may have inherited their shares; but the majority bought them in the open market—mostly at a heavy premium. The Company has for some few years been paying dividends at the rate of 15 per cent.; and, as the price charged for gas was only 3s. 9d. per 1000 cubic feet, the stock was considered the soundest and securest of investments. Under a sliding-scale which is graciously included in the Bill, the dividend will drop, in the first year after enactment, to 7 per cent.; during the next two years, it will be 5 per cent.; and after that, 4 per cent. will be the rate—except in the event of the price of gas being reduced to the consumer, when ¼ per cent. may be added to the dividend for each penny reduction. That is to say, before the Company would be allowed to pay 10 per cent. on its capital, it would have to sell gas at 1s. 9d. per 1000 feet. Such of the shareholders as have confidence in the traditional British sense of fair play preventing this Bill from ever becoming law will probably hold on, rather than sell with the market in its present condition. But it is a cruel ordeal to which they are being subjected; and people whose income is wholly, or for the most part, derived from this source may be tempted to sell at a ruinous loss rather than risk seeing the whole of their stock rendered absolutely valueless.

They have not, if truth be told, much reason to expect any consideration from Labour when it is a question of confiscating property; and there is no saying where the process, once begun, will stop—certainly not with gas companies. The authors of the Bill cannot even charge the companies with being monopolists. That is a term of opprobrium which would be useful in a campaign like this if there were the smallest pretext for using it. But the most ruthless critics of the companies are never tired of telling them that the competition of electricity must ultimately prove their undoing. The Sydney companies have had keen rivals in electric supply concerns; but now they are to be smashed by the Government.

OTTOMAN GAS COMPANY, LIMITED.

Increased Dividend—Directors' Remuneration Raised.

The Ordinary General Meeting of this Company was held on Tuesday last, at the London Offices, Nos. 59 and 60, Gracechurch Street, E.C.—Colonel JAMES LE GEYT DANIELL in the chair.

The SECRETARY (Mr. A. W. Cooper) read the notice convening the meeting and the certificate of the Auditors; and the report and statement of accounts were taken as read. The report stated that the gas-rental for the half year to June 30 amounted to £22,325, as against £20,928 for the corresponding six months of 1911. The net profit was £4362, compared with £4598. The amount standing at the credit of the profit and loss account was £9685.

The CHAIRMAN, in moving the adoption of the report and accounts, said he thought the shareholders would have anticipated that the fact that the unfortunate war between Italy and Turkey was still going on would have entailed very serious consequences upon the operations and business of the Company in Smyrna—the port and the district with which they were concerned. Although it was impossible that such a state of things could exist without in a measure affecting the Company, he was happy to be able to tell the proprietors—to use the words of their excellent Manager (Mr. John Gandon)—that the Company were strong enough to withstand these circumstances, if not without any appreciable, at any rate without serious, consequences. The first thing to affect the Company, as everybody knew who was connected with the gas business, would be the price of coal, which had cost them last half year £2643 more than in the corresponding period of 1911. This represented some 6s. per ton more. On the other hand, they had carbonized a larger quantity of coal, and had sold more gas; the increase being nearly 6¼ million cubic feet. The make of gas per ton was 11,390 cubic feet. The gas-rental showed an increase of £1400; and for this they must give the private consumers the credit. Mr. Gandon reported that they had obtained 336 new consumers during the half year under review. Not only had the gas-rental increased, but the residuals had returned over £1000 more as compared with 1911. As they would see, the reserve fund stood at £28,000, and the amortizement at £28,701; and on looking at the other side of the account, the proprietors would observe that the investments had been written-down to the price of the day—that was, at June 30. The Company, however, he was pleased to be able to say, were never in a sounder position than at the present moment; and really some evidence of this soundness was seen in the fact that, in spite of adverse circumstances, in spite of the high price of coal, and in spite of difficulties of labour, the Directors showed the proprietors a position of affairs that he felt sure they were scarcely prepared for. The Board therefore thought the time had arrived when the shareholders should participate in the improvement of the position, consistently with the policy that the Directors had pursued, and which they proposed to pursue in the future. A resolution would later be submitted for the distribution of a dividend for the half year at the rate of 10 per cent. per annum. The Board would continue to follow their policy of looking ahead, and had now under consideration with Mr. Gandon, and with the assistance of their Consulting Engineer (Mr. A. F. Phillips), the value of whose opinion they all knew, the necessity (involving outlay) of being prepared for the business they had in view as soon as peace was restored to the country. They had all of them gone through, here and elsewhere, a period of considerable anxiety. Perhaps he might be allowed to briefly refer to the portion of the notice convening the meeting which dealt with the remuneration of the Board. The Directors as a body thought they had come to a point when the Company should be asked to relax somewhat the terms and conditions under which they had worked. It was a delicate subject to touch upon; but he had only to remind the proprietors that they had on the Board men whose time was of great value, and whose character and experience were well known. As he had had the honour of presiding over their deliberations, he might say that there had never in his experience been the slightest hesitation on their part in giving their time, thought, and action in conducting the affairs of the Company. From a paper which had been placed in his hands, he found that in 1890 (the earliest obtainable calculation from the present books) the output of gas was 47,609,000 cubic feet; whereas in 1911 it was 165,782,000 feet. In the year 1872 the profit was £770; and in 1911 it was £10,476. He thought these were points which should be put before the proprietors for their consideration.

Colonel STEPHENSON R. CLARKE, C.B., seconded the motion; and it was at once unanimously carried.

The CHAIRMAN proposed that dividends for the half year be declared at the rate of 7 per cent. per annum on the preference shares, less income-tax, and at the rate of 10 per cent. per annum on the ordinary shares, tax free.

Mr. A. M. PADDON, in seconding, remarked that he was sure the gratification of the Directors in submitting the proposal would be equalled by the pleasure of the proprietors in agreeing to it. The shareholders knew the increased dividend would not have been recommended if the circumstances had not justified it; but he was sure they would not think it had been lightly earned, when they considered the conditions in the teeth of which it had been won.

The motion was agreed to.

The CHAIRMAN then proposed a vote of thanks to the Engineer, the Secretary, the Consulting Engineer, and the staff in Smyrna and London. He said he was happy to see Mr. Gandon with them that day, and would ask him to assure his staff that the sympathy of the Directors and the shareholders was with them in the anxious period they must have gone through during the time of war and rumours of war. They had done wonderfully well for the Company.

Mr. T. WILKINS seconded, and the vote was heartily accorded, and acknowledged by Mr. GANDON, Mr. PHILLIPS, and Mr. COOPER.

Mr. A. W. OKE next moved that a hearty vote of thanks be passed to the Chairman and Directors, and that the remuneration of the Board be increased by £450 a year, making it in all £1500. He pointed out that under the Articles of Association (which were dated 1862) the Directors were empowered to receive £1050, or such sum, not less than £700, as the shareholders in general meeting might determine. As a matter of fact, the shareholders left this entirely in the hands of the Directors, and for the first few years' of the Company the Board only divided among themselves £700 for seven Directors. From 1876 to 1902, they received £600 among five Directors. Then this was raised again to £700, and from 1908 to 1911 the full amount of £1050 was divided. In 1908, it was decided by the shareholders to reduce the number of Directors from seven to five. It was not until 1873 that a dividend of 2 per cent. was paid on the ordinary capital of the Company. In the following year it was 3 per cent.; in 1881 it was 5 per cent.; and in 1885 it went up to 8 per cent. In 1887, however, it fell to 7 per cent., at which figure it remained for twenty years. In 1908 prosperity returned to the Company, and from that date until 1911 the dividend was 8 per cent. Now it was to be at the rate of 10 per cent, for the past half year. He thought they would agree with him that this was a "red letter day" in the history of the Company. They must remember, too, that a very wise and conservative policy had been adopted during the last few years by the Board in carrying out extensions from revenue; and not only had this been done, but a large debenture debt had been entirely paid off out of revenue. Thus the Company were in a strong position to-day—the best test of which was the fact that the capital per million feet of gas sold was £450, which was a low figure, especially for an undertaking situated as this Company's works were. This, he believed, was the jubilee year of the Company; and he urged them to signalize this, and the facts that the business was prosperous and that the shareholders were well satisfied with the policy of the Board, by passing unanimously the resolution he proposed.

Mr. T. H. COOKE seconded the motion, which was heartily and unanimously carried, and suitably acknowledged by the CHAIRMAN.

FATALITY AT THE BURY GAS-WORKS.

An inquest was recently held on the body of Thomas Meadowcroft, who died in the infirmary as the result of injuries received in an accident at the Bury Gas-Works. The regret of the Corporation at the fatality was voiced by the Deputy Town Clerk (Mr. R. Battersby), who said that deceased had been in their employment for twenty years, and was a valuable servant.

A son of deceased, in giving evidence, stated that his father was a labourer at the gas-works, and he had been speaking to him about ten minutes before the accident. At that time deceased was painting under the retort-house stage, and near the coke-conveyor. He was standing on a scaffold when witness was there. Witness did not see a step ladder there at the time. Deceased would have had to paint under the staging where the conveyor ran out from it. He was accustomed to this work. Later witness passed the same place again, and saw him lying on the floor underneath the conveyor chain. The step ladder was on top of him. One piece of the top above the uppermost step was broken off—a new break. Witness thought that deceased had been caught in the chain, and this might have happened through his getting between the bars of the chain while it was stationary, and then the conveyor being started. Sometimes the conveyor stopped for an hour, or for five minutes. The only way in which his father would be warned of the starting of the conveyor would be by word of mouth. There was no whistle or bell, and if there were, it would be no additional safeguard, because it would be heard at one end of the conveyor

and not at the other. The elevator man's position was in view of where his father was; but at the moment there was a cart standing in the way.

Thomas Lindley said he worked the coke-conveyor. On the afternoon of the accident, about 4 o'clock, he stopped the conveyor, and started it again in five or six minutes. At the time he knew deceased had been painting under the staging joining the two elevators, and he had seen him at about 3.30. Witness did not know where deceased would have to paint after he had done the part he was engaged on. When he started the elevator, he heard something break, and stopped the chain again. He looked towards the retort-house, and saw deceased drop to the ground from the chain. He had seen deceased carried by the chain before he dropped. The ladder fell before deceased. He was not accustomed to give any warning before he started the chain. But for the cart, he would have seen deceased. Generally, a man who was painting near a chain would inform him of the fact; but deceased did not do so.

Mr. Henry Simmonds (Gas Engineer) said that the conveyor consisted of a long chain which worked in a trough. The chain was made up of a number of staves about 2 ft. 3 in. apart, and this conveyed the coke along to the hoppers. They had three of these conveyors, but only one was working. The men who worked around knew the hours at which it was started. They kept some of the old hands painting about the works; and deceased had been there all the summer. He had worked as a stoker. In reply to Mr. S. Hird (H.M. Inspector of Factories), witness stated that he was prepared to consider the adoption of some form of sound signal, if it would not be too complicated. They had, however, had the conveyor working twelve years; and this was the first accident.

The Senior Resident Medical Officer at the infirmary said deceased when admitted was suffering from fractured ribs, spine, and left collar-bone. There was no chance of recovery; and he died the same evening from shock.

The Jury returned a verdict of "Accidental death."

PRICE OF GAS AT KEIGHLEY.

The statement of the working of the Keighley Gas Department for the past twelve months was last week placed before the Town Council by the Gas Committee.

The statement showed that there had been a gross profit on the year of £16,233, and a net profit of £7935. Of this sum, £6961 had been transferred to the general district rates; but with the balance of £8170 brought forward from the previous year, there was a surplus to carry forward of £9145. Mr. J. Harrison said it was estimated that the department had suffered by the coal strike to the extent of £1000. The gross profit showed a decrease of £1616; but this was more than accounted for by the recent reductions in the price of gas, increases in workmen's wages, and additional cost of materials. The net profits were £1198 less than last year, and the amount transferred to the rates was nearly £520 more than a year ago, and £950 more than two years ago. The surplus to be carried forward was £900 more than last year; but during the present twelve months they would have to pay £300 more for coal. With this addition, the Committee did not consider that a further reduction in the price of gas could be made at present. The gas sold during the past year was 4 million cubic feet less than in the previous year; but this falling off was entirely due to the reduction of output during the coal strike. The present debt on the gas-works was £62,969; but the actual liability on the undertaking was only £24,002. Mr. Coleman said he would like the Council to recommend the Committee to reduce the price of gas in preference to giving so large a sum from the profits for relieving the rates. Mr. Sellers pointed out that during the past four years gas had been brought down in price from 2s. 3d. to 1s. 11d. per 1000 cubic feet, which was equivalent on the past year's revenue to a sum of £5000. Alderman Midgley asked how it was that there was £1490 less in the reserve fund than there was a year ago. Mr. Harrison replied that several items of expenditure had been charged against the fund. He admitted that it had been diminished by the amount named.

THE HALIFAX GAS-WORKS FATALITY.

A verdict of "Accidental death from carbon monoxide gas poisoning" was returned by the Coroner's Jury who inquired into the death at the Halifax Gas-Works of David Martin, a bricklayer. Deceased was doing some cleaning-out work in connection with a new bench of retorts when he was missed. He was subsequently found unconscious in the setting, and died an hour after being rescued. It was stated that the furnace next to the one where Martin was working was alight at the time; but each bed of retorts was separated by a 23-inch wall, and the connections of the flues with the main flue were stopped by dampers. Two men were overcome in trying to rescue deceased; and one of these (Robert Walton) attended from the infirmary to give evidence. He stated that about an hour before his attention was called to Martin he had encountered fumes at the top of the setting, and had to go into the yard for fresh air. The fumes must have penetrated the wall of the next bed and come out of the manhole. The fact of the leakage was not mentioned to anyone, as it was thought that it was not serious. When Martin was missed, witness went to the manhole entrance; and the fumes overcame him again. It was stated by Fred Girdler, the foreman, that he had never known a case like this before, and could not account for it. No one had been in the furnace since the accident; but the dampers were shut, and no leaks could be detected. There was still a slight smell of waste gas from coke. It was usual to work in a setting adjoining a lighted furnace. Mr. W. B. M'Lusky, the Halifax Gas Engineer, said that in his 25 years' experience he had never known such an accident. Though the dampers had

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been properly secured, it was quite possible that gas might have come from the main flue; but in his opinion the gas which reached Martin percolated through the wall of the adjoining oven. He was convinced that the man was overcome and poisoned by carbon monoxide gas. In examining the oven, he detected a slight leakage.

ELECTRICAL FAILURES, ACCIDENTS, AND FIRES.

[From "The Engineer."]

There has recently been quite an epidemic of accidents in electrical power-houses. Some weeks ago, the trains on the underground system of London were brought to a standstill by a failure in the supply from the Lot's Road station in Chelsea; a disastrous explosion occurred in the electric lighting station at Bray; a failure in the supply took place at Norwich, owing to the recent floods; a fly-wheel burst in the station at Maidenhead; and last, but not least, a short-circuit at Islington was the means of extinguishing the electric lights in the borough from 8 p.m. on Monday, Sept. 9, until 7 o'clock next morning.

It is certainly curious that all these mishaps should have followed one upon the other, especially as failures in supply are now more or less rare occurrences; but having regard to the many things that may upset the working of an electric generating station, it is still more surprising that the supply of electricity so rarely fails. A central station engineer can never leave his work and enjoy a rest with the same ease of mind as those engaged in most other pursuits; for he recognizes perfectly well that, no matter what care has been exercised in the design and lay-out of his plant, there is always a possibility of something serious happening. A drop in the steam pressure may put the consumers to a great deal of inconvenience; a short-circuit may occur in the station or on the mains, and so extinguish the lights; a stoppage in the supply may be caused by bad synchronizing; the boilers may be deprived of feed water; a breakdown in an engine may render the remainder of the plant inadequate to deal with the load; and a multitude of other troubles may arise.

Let us examine the five accidents we have just referred to. The stoppage in the supply from the Lot's Road station was, we believe, the result of some fault which originated on the switchboard, and was apparently brought about by the failure of insulation. The Bray accident, which unfortunately was of a very serious character, was caused by the bursting of an air-storage cylinder of a Diesel engine, owing to the use of oxygen for raising the pressure in the receivers. This accident is without parallel; and, according to the report of the National Boiler and General Insurance Company, no one can be held blameworthy. Similarly, the flooding of the station at Norwich constitutes a mishap of quite an exceptional character. Again, the fly-wheel accident which occurred at Maidenhead on Wednesday, Sept. 4, is to be regarded as an unusual occurrence so far as electric light stations are concerned. By the bursting of this fly-wheel, great damage was done, and many factories had to stop work, as no electric power was available, and only a restricted lighting supply could be given in the evening. The Islington mishap appears to have originated from a short-circuit, which occurred in a bifurcating box; and the fire which resulted became so serious that the usual appliances were unavailing, and the ordinary fire-brigade methods had to be brought into use. From the information available, it would appear that a single turbo-generating set was affected; and though the machine was apparently disconnected from the switchboard and the steam supply cut off, the heat from the fire was so intense that the field switch was inaccessible. Consequently, as the rotor of a turbo-generator takes an appreciable time to come to rest, the arc was maintained, and the use of water to extinguish the fire became necessary. The whole of the switchboard was saturated, and herein lies the explanation why such a long time elapsed before the supply was restored.

We see, then, that in two cases out of the five the trouble can be attributed to electrical causes; and we are inclined to think that if a record had been kept of all the causes of failures in electricity supplies, this would show that electrical fires have been responsible for some of the most serious. Anyone who has seen a really good fire of this description will never forget it. The damage done in the course of a few seconds is enormous. Those who know anything of central station working are aware that such outbreaks have destroyed many main switchboards. Though such troubles are now comparatively rare, and the lessons learnt in the early days of electric lighting have had a decidedly beneficial effect upon the design of electrical machines and apparatus, it seems to us that, in view of what has taken place at Islington and elsewhere, some attention should be directed to the question of the control of field-circuits. That is to say, some means should be provided so that, in the event of a serious electrical fire developing, the currents in the field-windings of all the generators could be reduced, or even entirely interrupted simultaneously. This could be done automatically with the fall in the station voltage, or it might be accomplished by hand. In either case the field-controlling device should be placed away from the main switchboard, and in a position where, no matter what conditions may prevail, it is easily accessible. There is little difficulty in the way of the application of such a scheme when all the field magnets are energized from common excitation bus-bars; and, as a matter of fact, we can call to mind at least one central station in London where such a scheme was adopted. But in this particular case the gear was designed to work automatically; and as there was fear of its acting at times when it should not, the apparatus was put out of action. We are not at all sure that automatic control is advisable, since a short-circuit will often quickly clear itself; and in the case of traction stations there is risk of the gear operating with every little fault that develops outside. Fuses mounted on individual machines should minimize the chances of serious fires arising from short-circuits occurring in cables between the generators and switchboard; but in view of all that has occurred, it seems that the use of some other arrangement is desirable.

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THE NATIONAL OIL SUPPLY.

Mr. Gilbert R. Redgrave, whose original letter in "The Times" on the subject of the production of oil from our own coalfields was followed, among others, by the one from Mr. Herring noticed in last week's "JOURNAL" (p. 767), replies in the columns of our contemporary. The main portions of his communication are reproduced.

The best coal from the aspect of oil production is the now somewhat neglected cannel coal, formerly in such great request for gas making. Experiments have lately been carried out with Abram cannel coal from Wigan. Treated by the ordinary gas-works method, this coal yielded 16,680 cubic feet of 42-candle gas per ton, with 24·5 gallons of tar, 2·5 gallons of ammoniacal liquor, and about 920 lbs. of coke. When distilled under a vacuum, in accordance with the process which I had in mind when writing, it gave a produce equivalent to 89·5 gallons of oil per ton of coal. This figure includes 4·4 gallons of very thick tar. The yield of crude oil, exclusive of tar, was equivalent to 85·1 gallons per ton. After being refined, this oil, which had a specific gravity of ·951, produced 3 per cent. of naphtha and 25 per cent. of illuminating oils, sp. gr. ·841; and it was thus very similar in character to that obtained from the distillation of shale. The coke secured from the treatment of cannel coal is an exceedingly good domestic fuel.

In order to furnish comparative figures for Lancashire coal, also treated by the vacuum process of distillation, I may state that one ton of "D.S." nuts produced 20·19 gallons of water-freed tar; and this would be a fair average for ordinary house coal. The gas production from bituminous coal may reach from 5000 to 6000 cubic feet per ton, and the yield of coke is in the vicinity of 14 to 15 cwt. I do not anticipate that coke produced in this way could compete with coke-oven coke for iron manufacture; but I do consider that such coke would be very valuable for ordinary domestic purposes. The high oil yield would render us independent of the foreigner, and the gas should be employed in the internal combustion engine for the generation of electricity.

I am entirely in accord with most of the facts stated by Mr. W. R. Herring in his letter; but I have had no experience of the compound system of distillation to which he refers. I do not, however, see the advantage of the final high-temperature treatment, which can lead only to an increased production of gas with a reduction in the yield of coke; and the improved output of ammonium sulphate would, I consider, be dearly bought by these means.

While the coke-oven process has mainly in view the resultant coke, and the gas-works manager looks only to the gaseous constituents, I want to inaugurate a system of treatment which shall aim at the production of a smokeless fuel, adapted for household use, combined with the extraction of those residuals for which there will be in the future an enormous demand. By keeping the evolution of gas at the lowest possible level, the colliery owner will still be able to generate all the electricity needed in this country at a price well under 1d. per B.T.U., and will reap a handsome pecuniary reward, as is now being done in many parts of Germany. If I were to figure out the results of the treatment of a large tonnage of coal, bearing the above facts in view, the results would probably amaze readers.

GAS AND ELECTRIC TRAIN LIGHTING.

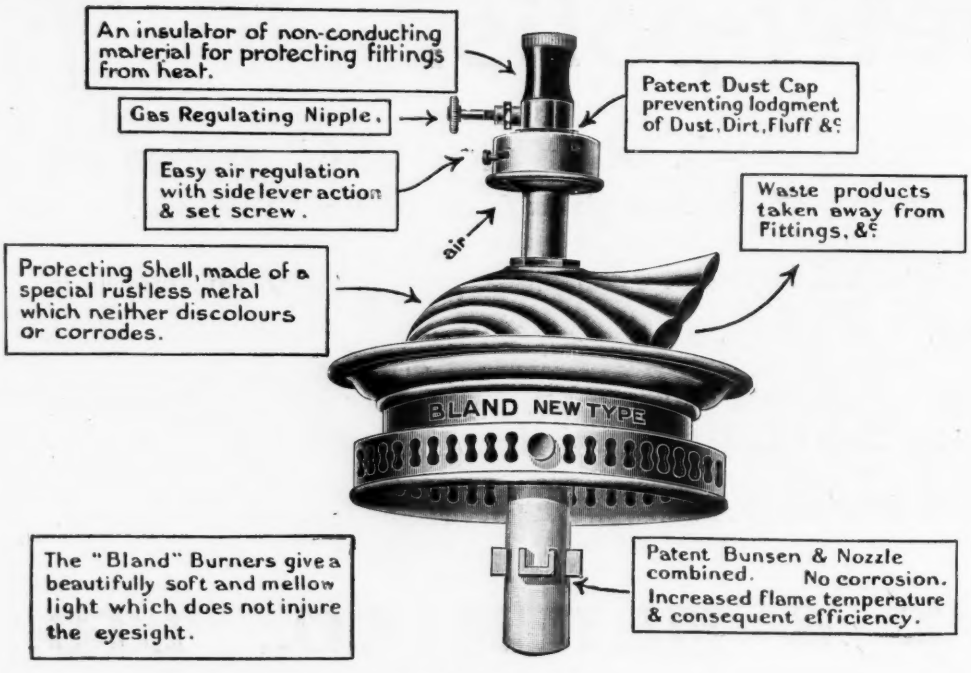
In connection with articles which (following on the recent lamentable accident at Ditton Junction) have appeared in its pages on the question of the lighting of railway trains, the "Pall Mall Gazette" publishes a table compiled from "Whitaker's Almanack" and the "Electrical Trades' Directory," showing the total number of carriages in use by different railway companies, and how many of them are electrically lighted.

	Total.	Electrically Lit.
Barry	152	148
Caledonian	2,439	260
Glasgow and South-Western	1,357	49
Great Central	1,825	499
Great Eastern	5,297	341
Great Northern	3,239	293
Great Northern (Ireland)	663	425
Gt. S. and Western (Ireland)	881	9
Great Western	7,765	402
Highland	494	Nil
Lancs. and Yorks.	4,733	248
London, Tilbury, and Southend	548	523
London, Brighton, and S.C.	3,048	782
London and North-Western	9,380	830
London and South-Western	4,231	1,532
Midland	5,484	192
Mid. and Gt. Western (Ireland)	400	104
North British	3,425	243
North-Eastern	4,616	323
North Staffs.	434	364
South-Eastern and Chatham	4,056	2,160
Taff Vale	347	Nil
	64,814	9,713

The writer adds that it must be remembered that the total number of coaches includes some which are not in every-day use. The South-Eastern and Chatham Railway has the highest percentage of electrically-lit rolling-stock; and the London and South-Western Railway comes next. From the grand totals, it may be reckoned approximately that for every five coaches lit by gas one is lit by electricity.

The Llandrindod Wells Urban District Council have under consideration a scheme for extending the water supply, consequent on the rapid growth of the town.

BLAND HEAT RESISTING BURNERS.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NOTES FROM SCOTLAND.

From Our Own Correspondents.

Saturday.

Auchterderran.—The Cardenden Gas Company, Limited, of Bowhill, appealed against the Assessor's valuation of £583 in respect of their premises, which they claimed should be entered in the valuation roll at £486. Mr. Andrew Wishart, who represented the appellants at the annual Lands Valuation Appeal Court for the Western District of Fife, held on Tuesday at Dunfermline, argued that allowance should be made in respect of gas-cookers, without which no gas company could hope to make a success of their business. He added that gas development had made so much progress that it was not possible for a company to raise the revenue on which the Assessor based his valuation if these cookers were not installed. The Court granted a reduction to £500.

Cullen.—At a meeting of the Banff District Committee, held at Banff on Saturday, it was agreed, on specified conditions, to grant permission to the Cullen Gas Company to open roads and streets in the district, where necessary, in connection with the proposed supply of gas from Cullen to Portknockie and Findochty.

Dumbarton.—A successful exhibition has been held at Dumbarton; there having been about 700 applications for domestic appliances received by the Gas Department in the three days it remained open. An excellent show of heating, lighting, and cooking apparatus was made by a number of firms; and crowded cookery lectures and demonstrations were given by Miss E. M. Dods. Referring to the matter, the "Lennox Herald" says: "Altogether, the exhibition was a feather in the cap of Mr. J. G. M'Geachin (the Gas Manager), as it must have been a source of profit to the firms exhibiting. It has displayed the virtue of initiative in the Gas Department; and the Committee must give their officials full facilities to take advantage of what has been gained. The responsibility of the Gas Manager should not end at the station-meter. He should be brought into the town, and judged by the quality of his product on tap there. At least, that is the way an ordinary trading concern meets competition." In Dumbarton, a progressive policy is adopted. Gas cooking-stoves are being hired out at reduced rentals; while grills, range-plates, and boiling-rings are supplied free of charge and fixed free. Gas fires and radiators are supplied at net cost price and fixed free up to 20 feet of piping.

Dundee.—The Dundee Water Commissioners on Wednesday visited Lintrathen Loch, the source of the city's water supply, at which important works have just been completed. The storage at Lintrathen reservoir has been increased from 1,601,000,000 gallons to 2,130,000,000 gallons—an addition of over 500,000 000 gallons—for the relatively small outlay of £13,200. The two large arable farms of Inzion and Foldend, extending to about 850 acres, have been purchased. Including the purchase of land, the extensions have cost about £33,000. At a luncheon given by the Commissioners, Mr. James Cunningham, President of the Chamber of Commerce, said the water undertaking of Dundee had been engineered with extraordinary foresight and ability. Lord Provost Urquhart said they looked forward to having a water supply sufficient for Dundee for the next hundred years.

Glasgow.—A gas explosion took place on Friday evening in a house at Douglas Street, Anderston, occupied by John M'Arthur. There was a gas escape in the house, and M'Arthur was attempting to locate it by means of a lighted paper, when the explosion took place. M'Arthur was severely burned, and considerable damage was done to the house as the result of the explosion.

Greenock.—The Manager of the Greenock Gas-Works has been instructed to complete plans for the construction of show-rooms in West Blackhall Street; the estimated cost of the scheme being £2000.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Sept.* 21.

Sulphate of Ammonia.

There has not been any resumption of activity in the market for this commodity, and during the past week prices have again given way slightly. Consumers both at home and abroad remain somewhat apathetic, and middlemen are evidently in no hurry to cover their commitments. The nearest values at the close are £14 7s. 6d. to £14 8s. 9d. per ton f.o.b. Hull, £14 8s. 9d. to £14 10s. per ton f.o.b. Liverpool, and £14 10s. to £14 11s. 3d. per ton. f.o.b. Leith. In the forward position manufacturers still refuse to make any concession on the prices recently quoted by them, but it is reported that dealers are offering for October-March delivery at practically prompt values.

Nitrate of Soda.

The tone of this market is again firmer, and the quotations on spot have been raised to 11s. 6d. per cwt. for ordinary and 11s. 7½d. for refined quality.

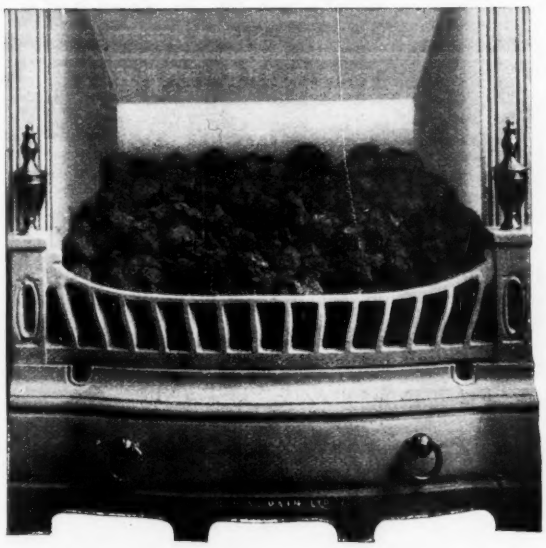
LONDON, *Sept.* 23.

Tar Products.

The markets for tar products remain fairly steady. There has been some further selling of pitch during the past week at lower prices; consequently the value is a little lower. Benzols are in good demand and continue firm. There is still a good inquiry for solvent and heavy naphthas; but there is no alteration in the price. Crude carbolic shows signs of weakening. Creosote is in good demand, and high prices are still being paid.

The average values during the week were: Tar, 29s. 3d. to 33s. 3d. Pitch, London, 49s. to 49s. 6d.; east coast, 48s. 6d. to 49s.; west coast, Clyde, 49s. 6d. to 51s. 6d.; Manchester, 48s. 6d. to 49s. 6d.; Liverpool, 48s. 6d. to 49s. 6d. Benzol, 90 per cent., naked, London, 1s. 1d. to 1s. 2d.; North, 1s. to 1s. 1d.; 50-90 per cent., naked, London and North, 10½d. to 11½d. Toluol, naked, London, 11½d. to 1s.; North, 11d. to 11½d. Crude naphtha, in bulk, London, 5½d. to 6d.; North,

THE KING OF GRATE FIRES



is the

"ST NICHOLAS."

Its sway is rapidly extending.

Because it is the simplest method of converting a coal grate into a gas fire.

Because it unites the economy of a gas fire with the traditional appearance of a coal fire.

Fits any grate.

R. & A. MAIN, LIMITED,

WORKS: Gothic Works, EDMONTON, N.; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.

SHOW-ROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W.; 136, Renfield Street, GLASGOW; 56, Broad Street, BIRMINGHAM; 83, Old Market Street, BRISTOL; 13, Whitworth Street West, MANCHESTER; 8, Exchange Place, Donegall Street, BELFAST; 333, Queen Street, MELBOURNE; and 12, Cunningham Lane, Pitt Street, SYDNEY, N.S.W.

5d. to 5¼d. Solvent naphtha, naked, London, 1s. 1½d. to 1s. 2d. f.o.b.; North, 1s. 1d. to 1s. 1½d. f.o.b. Heavy naphtha, naked, London, 11½d. to 1s. 0½d. f.o.b.; North, 10d. to 10½d. f.o.b. Creosote, in bulk, London, 3d. to 3¼d.; North, 2⅞d. to 3d. salty, 3⅛d. to 3¼d. liquid. Heavy oils, in bulk, 3¼d. to 3⅜d. Carbolic acid, casks included, 60 per cent., east coast, 2s. 6d. to 2s. 7d.; west coast, 2s. 5d. to 2s. 6d. Naphthalene, £4 10s. to £9 10s.; salts, 45s. to 50s., bags included. Anthracene, "A" quality, 1½d. to 2d. per unit, packages included and delivered.

Sulphate of Ammonia.

The market has continued dull during the past week, but prices remain about the same. Manufacturers are still very firm as to the forward position, and are quoting a premium on to-day's values. Actual Beckton is quoted at £14 2s. 6d.; outside London makes, £13 17s. 6d. to £13 18s. 9d.; Hull, £14 10s.; Liverpool, £14 12s. 6d.; Leith, £14 15s.; Middlesbrough, £14 10s.

COAL TRADE REPORTS.

Scotch Coal Trade.

The healthy condition of the coal trade throughout Scotland has been well maintained during the past week. The demand continues unabated, and prices rule firm. On Thursday, the quotations f.o.b. Glasgow were: Steam coal, 11s. 6d. to 12s. per ton; splint, 13s. 6d. to 14s.; ell, 12s. to 12s. 6d.; trebles, 13s. 6d. to 14s.; doubles, 13s. to 13s. 6d.; and singles, 12s. to 12s. 6d.

Northern Coal Trade.

There is still a scarcity of steamers at the coal ports. The trade of the North is, therefore, a little impeded; and this makes the tendency of the prices to be for some kinds rather weaker. In steam coals, best Northumbrians may be quoted from about 13s. to 13s. 6d. per ton f.o.b. Second-class steams are 11s. 9d. to 12s. per ton; and steam smalls are about 8s. 6d. to 9s. 6d. The production at the collieries is good, and it is well taken up. In the gas coal trade, the consumption shows a steady increase. Best Durham gas coals are about 12s. 9d. to 13s. per ton f.o.b.; second-class gas coals are about 12s.; and "Wear Specials" are from 13s. 6d. to 13s. 9d. In contracts, the Gothenburg gas coal orders have been booked for Durham coals; and though the prices have not been officially declared, it is believed that somewhere near 11s. 9d. to 11s. 10½d. is the f.o.b. price. There are negotiations in progress for sales of gas coal to Italian towns; but the very high freights quoted for the sea carriage hinders the conclusion of this business. Generally, however, the demand is very great for Durham coals; and this stiffens the price of gas coals. Coke is very firm. Gas coke is now quoted at 20s. 6d. to 21s. per ton f.o.b. for good makes.

New Joint-Stock Companies.—The Heathfield and District Water Company, Limited, has been registered with a capital of £10,000 in £1 shares. A Company has also been registered under the title of Buckleys (London) Gas and General Engineers, with a capital of £3000, in £1 shares.

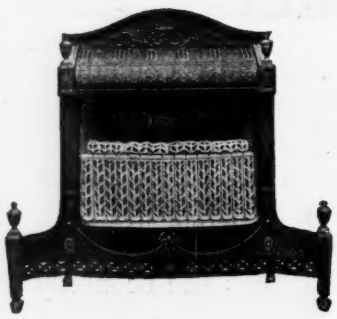
Slack Heap on Fire at a Gas-Works.—A large heap of slack, estimated to comprise several thousand tons, located under a shed in the yard at the Lancaster Gas-Works, was recently discovered to be on fire. Prompt efforts were made to extinguish the fire; but smouldering continued for three or four days. The outbreak was attributed to spontaneous combustion.

Fatal Result of a Gas Explosion.—An escape of gas being noticed in the offices of a Stamford firm of Solicitors, the Managing Clerk stood on a table and applied a lighted match to the top of the chandelier, where it was thought there might be an escape. The sequel was disastrous, for the resultant gas explosion wrecked the room and blew out the masonry of the window. Unhappily, a Mrs. Warr was passing the premises at the time, and a large piece of the stonework fell upon her head, crushing her skull, and causing instant death.

An Accidental Gas Poisoning Case.—At a Coroner's inquiry at Woolton, relating to the death of Owen Jones (34), an engineer, of Allerton, it was stated that deceased was found dead over a gas-cooker last Wednesday morning. The evidence showed that he was a man of intemperate habits, and had been drinking heavily for some time. He went to bed on the Tuesday night under the influence of drink, and some time later the other members of the household retired, leaving everything right. Deceased was in the habit of getting up in the night to prepare food for himself; and it was noticed that there was a spent match at the gas-cooker. The assumption was that he had intended to light the burner but failed to do so, and was suffocated by the escaping gas. The Jury returned a verdict of "Accidental poisoning."

Report on the Audley Gas-Works.—Mr. E. D. Wootton, of Cockermouth, who was engaged by the Audley Urban District Council to make an examination of the gas undertaking, has reported that the average number of consumers per mile of main is 100. This, he says, is well below the normal; so that, apart from the age of the mains and their condition, the Council's leakage was abnormal. A point affecting the leakage he found to be the public lighting. Some incandescent gas-burners would pass as much as 7 cubic feet per hour, whereas a consumption of 4 cubic feet was sufficient. This leakage could be obviated by fitting governors to all the lamps. The leakage they suffered amounted in money value to an equivalent of over 6d. per 1000 cubic feet of gas sold; and to remedy this condition, he recommended that attention should be given to the mains which were over thirty years old. If the work cost £880, and a reduction of about 50 per cent. of the leakage was effected, this would be equivalent to a saving of £134 a year, or equal to 3¼d. per 1000 cubic feet on the present sale of gas; whereas the annual repayment of the sum borrowed to carry out the work, and the interest for a ten years' loan, would be £110.

WRIGHT'S GAS-GRATES.



"KENILWORTH" Dog Grate.

"BASKERVILLE" Dog Grate.

"SIRIUS" Dog Grate.

These handsome gas-grates are specially designed for placing in an open hearth. The "KENILWORTH" and "SIRIUS," being fitted with canopies and flues, can be placed with pleasing effect in front of a tiled surround. Send for full particulars.

JOHN WRIGHT & CO., Essex Works, BIRMINGHAM.

Cleckheaton and the Coal Strike.—The output of the Cleckheaton Gas-Works for the year to March 31 was greater by 5 million cubic feet than in the preceding twelve months; but the net profit, at £3263, was nearly £200 less. Doubtless as a result of the coal strike, coal and cartage cost about £400 more than in 1910-11. The amount of mortgage debt on the works has been reduced to £16,363, against which there are accumulated reserves of over £11,000.

Gas Manager's Suicide.—Telegraphing last Friday, the Paris correspondent of the "Daily Mail" says: "Continual complaints from gas users have driven the Manager of the Poissy Gas-Works to commit suicide. For some time past, the unfortunate Manager has been overwhelmed with letters complaining of the quality and low pressure of the gas. Yesterday, owing to an accident, the service was again unsatisfactory, and complaints poured in more numerous and violent than ever. The Manager thereupon blew out his brains with a revolver."

Gas-Workers' Wages at Halifax.—The Halifax Gas Committee have had under consideration a request by the meter inspectors to consider the question of granting them an increase of wages. The matter, having been discussed, was adjourned for further consideration in January. A similar application was made by the coke-wheelers; and in this case the Committee recommended an average increase in wages of about 1s. 10½d. per week. A resolution of sympathy was passed with the widow and family of David Martin, who met his death at the gas-works under circumstances recorded in another column.

Belfast Gas-Works Extension.—It was explained at a special meeting of the Belfast County Borough Council, held to sanction the creation of £100,000 of 3½ per cent. redeemable stock, that the Gas Committee were committed to a very considerable expenditure, and would from time to time, in order to meet their engagements, require the whole of this amount. It was not intended to issue all of the stock at once, but only a portion sufficient to provide for the more immediate capital requirements. Though the extensive scheme of reconstruction at the gas-works was proceeding energetically, thanks to the prudent and capable administration of the Gas Committee, the remainder of the issue could be held in reserve for several months. The minimum price of issue is to be 92½ per cent..

Oldham Gas-Workers' Wages.—The application of the Gas-Workers and General Labourers' Union for an advance in wages to members employed at the Oldham Corporation Gas-Works has been further considered by the Gas Committee. Beyond an advance in wages, the men asked for a week's holiday per annum with pay, and payment of double time in all cases where such is not now paid for work on Christmas Day and Good Friday, and single pay if not working on these days. The Committee having considered the matter resolved: (1) That, as regards the gas workers, the Committee adhere to their previous decision not to grant the application; (2) that the consideration of the application for an increase of the wages of the labourers at the several gas-works be adjourned until the whole question of labourers' wages has been fully considered by the labour-employing committees of the Corporation.

Gas Purchase Question at Slaithwaite.—The Slaithwaite Urban District Council have decided to approach the Directors of the local Gas Company, for the purpose of ascertaining whether they are willing to sell their undertaking, and, if so, at what price. The Clerk told the Council that he had drafted out a rough estimate of what he thought the cost would be, and he made it work out as follows: Share capital to be bought, £30,750, add 10 per cent., £3825; Act of Parliament £2175, and Gas Company's loans £6760—giving a total of approximately £43,000. This sum borrowed for thirty years would necessitate the repayment annually of loan and interest of £2486. Deducting £1650 (the profit made last year by the Gas Company), this would leave £800 to be found each year out of the rates.

Ashton and District Water-Works Undertaking.—The official opening of the pressure-filter installations at the Brushes and Ashway Gap reservoirs, Greenfield, for the Ashton, Stalybridge, and Dukinfield (District) Water-Works, took place last Thursday, in the presence of about 100 representatives from authorities interested financially in the undertaking. The scheme of filtration, said to be one of the largest of its kind in the country, has been put down at a cost of £30,000, and consists of 36 pressure-filters, 18 at each place, designed to purify collectively 5,352,000 gallons of water per day. Alderman Ridyard, the Mayor of Stalybridge, in the course of his speech at the opening, referred to the magnitude of the Joint Board's undertaking—pointing out that when the work now in hand was completed the total cost of the scheme would be about £1,000,000. As stated in previous issues of the "JOURNAL," a large reservoir is now being constructed in the Chew Valley, which will have a holding capacity of 200,000,000 gallons. It covers an area of 35 acres, and the cost is put down at £120,000.

Costliness of Electricity for Heating Houses.—The following letter from Mr. A. H. Barker, of the Department of Heating and Ventilating Engineering at University College, London, appeared in the "Daily Mail" recently: "If any of your readers are induced to adopt electrical heating for their houses under the impression that they will thereby get them warmed at a moderately low cost, this idea will be effectively dispelled when they receive their first bill after the installation of the heaters. There are many fields in which electrical energy can be economically employed; but for heating houses by present methods and at present prices, or anything like present prices, it can never be otherwise than extremely expensive. By methods now in practical use, one unit of electricity when employed to generate heat cannot possibly produce more than 3400 heat units. At 1d. per electrical unit, therefore, the cost of electrical heating is 1d. for 3400 heat units. With coal at 25s. per ton, the same sum would buy about 7½ lbs. of coal. Any well-designed heating apparatus would deliver into the room from this pennyworth of coal 60,000 thermal units; so that even on the basis of 1d. per unit electricity as a heating medium is nearly twenty times as dear as coal. Before, therefore, electricity can compete with coal as an economical method of producing warmth, some way of generating electrical energy must be devised which will enable the current to be supplied at 1-20th of a penny per unit."

Welsbach

GAS MANTLES

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AND
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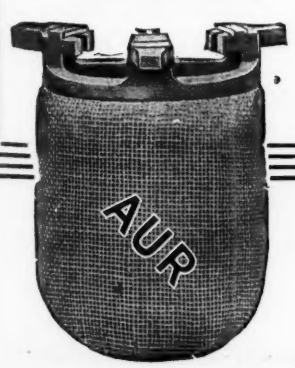
(C, CX, and PLAISSETTY).

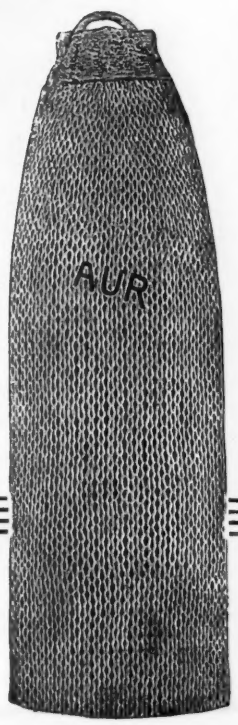
IN ALL SIZES TO SUIT ALL BURNERS.



The Original and still the Best.

EXCEPTIONALLY STRONG AND BRILLIANT.

The Dependable Mantles for Domestic and Street Lighting.



The WELSBACH LIGHT CO., LD.,

Welsbach House,

KING'S CROSS, LONDON, W.C.

Telegrams: "Welsbach London."

Telephone: North 2410 (4 Lines)

Automatic Controllers at Slough—During a discussion on the question of the working of the automatic controllers and the lighting of the pubilc lamps at a meeting of the Slough Town Council, the Surveyor reported as follows: "There are 368 controllers, 447 burners, and 368 lamps. The controllers, which were adopted in February, had been working 151 nights, and there were 325 unlighted or insufficiently lighted lamps during the period covered by this report. The primary cause of these going out was owing to the fact that no fewer than 198 were choked with flies and gnats. In 82 cases the gas was wilfully turned off; while water and naphthalene in the service accounted for the extinction of 32. Of the 368 controllers, only 13 were found to be faulty." As a remedy for the mischief done by the flies and gnats, it was suggested that the lamp-cleaners should dip their cleaning cloths in petroleum.

Harrington Gas-Works Loan.—As a result of representations made by Mr. J. A. Grant (the Member of Parliament for the Division) on the subject of the short period proposed by the Local Government Board for repayment of a loan for the purchase of the gas-works by the Harrington Urban District Council, the Board have written saying that "Mr. Burns is willing to allow a period of 25 years, instead of 20 years as previously intimated, for the repayment of the loan; but looking to the nature and probable life of the works, 25 years is the longest period that the Local Government Board could allow in this case." In the report of the previous Council meeting, "four years" was stated as the time for which the Board were willing to lend the money; so that there must have been a misunderstanding somewhere. However, the Council are now quite satisfied, and have passed a vote of thanks to Mr. Grant—besides awarding the Clerk (Mr. White) an honorarium of £25 as a token of their appreciation of the work he has done in the matter.

Bexhill Water and Gas Company.—The accounts of the Bexhill Water and Gas Company for the half year to June 30 show a balance of £6192 at credit of profit and loss available for dividend; and the Directors recommend dividends for the six months at the rate of 6½ per cent. per annum on the capital authorized by the Acts of 1885 and 1892, and £4 11s. per cent. per annum on the capital authorized by the Act of 1896, Order of 1901, and Act of 1904, less income-tax. This will leave £2481 to be carried forward. Notwithstanding the many difficulties arising from, and incidental to, the disastrous coal strike in the spring, the business of the Company has shown a marked improvement during the past half year; the total water revenue having increased by upwards of 4 per cent., and the gas revenue by upwards of 13 per cent., as compared with the corresponding period of last year. This improvement is being fully maintained, proving that the Company are now deriving benefit from the extensions of water and gas mains carried out during the last two years. Further extensions will be necessary in the near future to meet the demands made on the Company; and to meet the indebtedness incurred by these extensions; it is the intention of the Directors to make a further issue of capital.

APPLICATIONS FOR LETTERS PATENT.

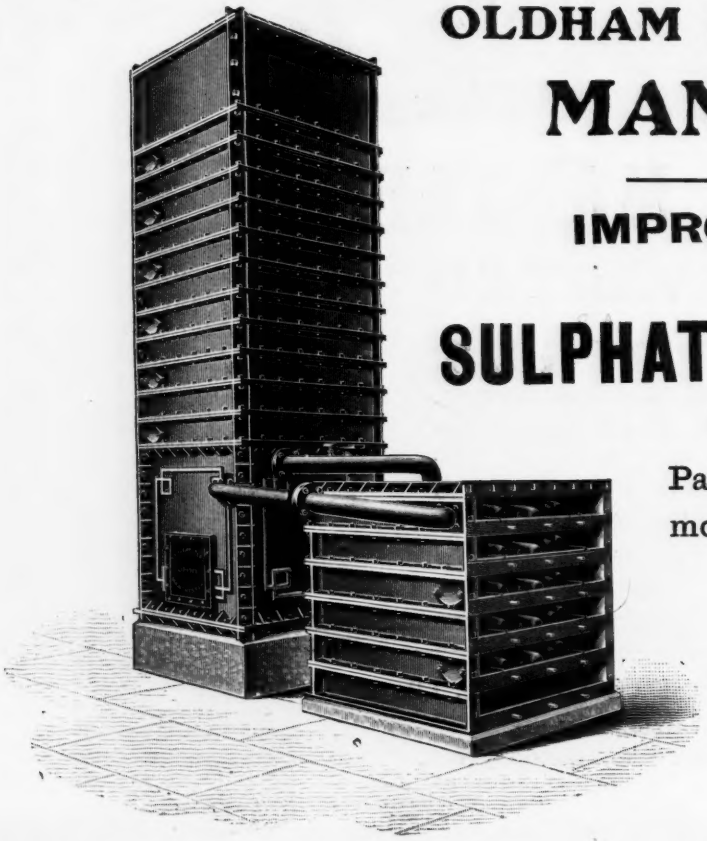
20,459.—Branson, F. W. "Audibly indicating changes of temperature." Sept. 9.
20,503.—Thomas, J., "Gas-burners." Sept. 9.
20,506.—Bridger, J., "Gas-stoves." Sept. 9.
20,516.—Bickerton, H. N., and the National Gas-Engine Company, Ltd., "Internal-combustion engines." Sept. 9.
20,526.—Jähnigen, F. P., "Gas-iron." Sept. 9.
20,534.—Storey, F. J., "Taps and cocks." Sept. 9.
20,550.—Sibley, J. T., "Gas-radiators." Sept. 9.
20,595.—Rogers, F., "Pyrometers." Sept. 10.
20,602.—Dickson, N., "Exhausters," &c. Sept. 10.
20,615.—Bentley, G. H., and Appleby, E. G., "Gas-producers." Sept. 10.
20,631.—Shaw, W. & W. H., and Prosser, H. R., "Device for use in the attendance to certain operations in connection with gas-mains." Sept. 10.
20,661.—Gardner, J. A., Bruges, F. H., and Ferguson, A., "Integrating apparatus for varying differential pressures." Sept. 10.
20,709.—Kuenzel, C. A., "Gas-generators." Sept. 11.
20,738.—Humphrey, H. A., and Rusdell, W. J., "Raising elastic fluids." Sept. 11.
20,805.—Parks, F., "Clip for shades." Sept. 12.
20,824.—Wade, C. T., "Gas-engines." Sept. 12.
20,841.—Helps, G., "Gas-lamps." Sept. 12.
20,900.—Coleman, W. H., "Treatment of gases." Sept. 13.
20,935.—Arndt, M., "Meters." Sept. 13.
20,938.—Williams, R. A., and W. J. Jenkins and Co., Ltd., "Charging apparatus or projectors." Sept. 13.
20,951.—Wilson, G., "Prepayment meters." Sept. 13.
20,990.—Lawton, W. A., "Gas and other heating and cooking stoves." Sept. 14.
20,991.—Boult, A. J., "Prepayment meters." A communication from the Compagnie pour la Fabrication des Compteurs et Materiel d'Usines à Gaz. Sept. 14.
21,000.—Jeffcock, C. E., and Yardley, W. H., "Extraction of impurities from gases." Sept. 14.
21,003.—Blanck, F., "Incandescent lighting." Sept. 14.

Bury Joint Water Board's Deficit.—Mr. R. W. Burton, Treasurer to the Bury and District Joint Water Board, shows in his annual report that the revenue from the domestic supply of water during the twelve months totalled £42,807, and that the amount to be provided by the constituent authorities is £12,983. The accumulated deficit, with interest, is now £192,253. Bury's precept this time, including the added areas, is £5436. Radcliffe comes next with £2209; then Rawtenstall, whose contribution amounts to £1343; and Haslingden with £1257—all the others being less than £1000.

R. & J. DEMPSTER, Limited,

OLDHAM ROAD,

MANCHESTER.



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Patent Lime Agitators and Removable Side Plates for easy cleaning.

OVER 60 RECTANGULAR STILLS AT WORK.

WRITE FOR PARTICULARS.

A Revolt of Gas-Fitters.—The 150 or so gas-fitters employed by the Sheffield United Gaslight Company, says the "Sheffield Daily Telegraph," have decided, by a unanimous and enthusiastic vote, at a meeting attended by 100 of their members, to refrain from attending a course of lectures dealing with the technical and practical details of their work, given by the Superintendent of their department. These lectures have been delivered for some years past, and the men are paid for their attendance. But they are dissatisfied, and object also to the requirement imposed upon them of going on to the platform to demonstrate before their "mates" how various jobs should be done. At a previous meeting they resolved to forward a letter to the Directors stating their objections; but on advice they withdrew it in favour of the "boycott."

Profit-Sharing in American Gas-Works.—The Directors of the Cambridge (Mass.) Gas Company have caused a letter to be addressed to their employees stating that, in appreciation of their loyal and faithful services during the year to June 30 last, they have decided to distribute among those deemed eligible a bonus equal to 5 per cent. of the wages received by them in this period. A Committee appointed to carry out the decision have determined that to be eligible to share in this distribution, the employee must (1) be in the employ of the Company at the time the distribution is made; (2) have been in the employ of the Company continuously since Jan. 1 last; and (3) have rendered such service as, in the opinion of the Committee, warrants such participation. The Directors point out that this form of profit-sharing is wholly an experiment, and they make no promises as to the future—preferring to wait and see the results. But they believe the plan will tend to give the employees a greater interest in their work, and will help them to realize that they are part and parcel of the Company, and in this way result in greater economy and profit to the Company, better service to the public, and a financial benefit year by year to the employees themselves.

The fire brigade were summoned to Piccadilly, Manchester, last Wednesday night, in connection with the fusing of an electric cable under the pavement. Flames shot into the air and neighbouring basements were filled with smoke. It was found, however, that there was no fire other than in connection with the cable, and so the brigade stood by while Corporation workmen repaired the fault, a job which took some considerable time.

The catalogue for the season 1912-13 of the Bland Light Syndicate, Limited, of No. 29, Little Trinity Lane, E.C., has been compiled with the idea of including in the space that is occupied (some 130 pages) just such articles as are likely to be of service to the lighting departments of gas undertakings. The different forms of Bland inverted and upright burners and mantles are shown, as well as an attractive assortment of glass-beaded and silk shades. Numerous types of outdoor high power lamps are illustrated, and also the Bland street-lamp conversion set. There are to be found in another section of the catalogue artistic fittings designed for use in all manner of situations. Grillers, cookers, meters, and geysers are some of the many other things included in the list.

The Bryan Donkin Company, Limited, of Chesterfield, forward a copy of a copiously illustrated and excellently prepared pamphlet which they have just issued dealing with their gas-exhausting plant. The parts of the improved Beale gas-exhauster are described; and the illustrations include various types of exhausting machinery, with a description of the leading features. Here are gas-driven, steam-driven, and electrically-driven exhausters of sizes and patterns to meet different requirements. The firm have now made over 2400 exhausters, representing a capacity of more than 123,000,000 cubic feet per hour; and their annual manufacture now represents plants having an output of over 16,000,000 cubic feet per hour. Valves, pumps, engines, compressors, fans, governors, &c., for gas-works are also dealt with in the pamphlet.

GAS COMPANIES' STOCK AND SHARE LIST.

The week just closed on the Stock Exchange may be set down as one remarkably devoid of interest—at least in the chief markets, for in one or two speculative corners there was some flutter attractive to those who took part in it. The general position, however, remained unchanged. Consols were cold-shouldered and left severely alone. Home Rails went heavily, and seemed unable to warm up in the slightest degree. The best points were the calmness of the Foreign Market, in spite of clouds upon the Near Eastern horizon, and somewhat brighter prospects in Americans. Business was very quiet all the week; and Saturday, being the most solemn Jewish fast, was almost non-existent for business purposes. The opening day was inactive, with a rather dull tone; there being more sellers than buyers. The firmness of money weighed on gilt-edged things; and Railways, with rare exceptions, were weaker. Americans were uneven, zig-zagging in response to orders from the other side. Tuesday was flat generally. Government issues gave way, Consols falling $\frac{1}{8}$; and Rails were dull and drooping, though the fall stopped before the close. Wednesday was quiet with a variable tendency swayed by circumstances. Consols touched 74. Rails began pretty well, but became doubtful later. Americans advanced. Thursday seemed quite devoid of animation except in one or two securities, and the tone was flat. Government issues languished for lack of support; and Rails made lower prices mostly. Friday's disposition was much the same. A failure was announced. Gilt-edged securities could attract no buyers, and Railways were lower, with the exception of one or two of the bigger lines. Americans went up and down. Saturday's business was a minimum quantity; but the tendency was steadier in general. Americans were quite strong. Consols closed without further change at 74 to 74$\frac{1}{4}$—a fall of $\frac{1}{8}$ in the week. In the Money Market, rates ruled very firm, with an anxious eye for gold withdrawals. Business in the Gas Market, though quiet, was at least a little more active than the week before; but the general torpor extended far enough to keep this department in a state of reduced animation. However, its strength remained unimpaired, and a few further advances in quotations were effected. In Gaslight and Coke issues, the ordinary was moderately busy, and was unchanged, with transactions ranging from 105$\frac{1}{2}$ to 106$\frac{1}{2}$. The secured issues showed dealings in the maximums at 82 and 82$\frac{1}{4}$, in the preference at 99, and in the debenture at 75 and 76$\frac{1}{4}$. South Metropolitan was also steady, changing hands at 116$\frac{1}{4}$ to 117$\frac{1}{4}$. In Commercials, the 4 per cent. realized 107$\frac{1}{2}$ (a rise of 1), the 3$\frac{1}{2}$ per cent. 101 and 101$\frac{3}{4}$, and the debenture 74 and 74$\frac{1}{8}$. Among the Suburban and Provincial group, Alliance and Dublin was dealt in at from 80 special to 82$\frac{1}{2}$, Bournemouth "B" at 16$\frac{1}{2}$, British at 45$\frac{1}{2}$, and Tottenham "B" at 116. On the local Exchange, an odd lot of Sheffield "C" fetched 230, and "B" and "C" issues were advanced to the level of "A." In the Continental companies, Imperial changed hands at 181 to 182$\frac{1}{4}$ (a rise of 2), Union preference at 134$\frac{1}{4}$, and European at 19$\frac{3}{4}$. Among the undertakings of the remoter world, Bombay was marked at 6$\frac{7}{16}$, Monte Video at 11 and 11$\frac{5}{16}$, Primitiva at 7$\frac{1}{16}$ to 7$\frac{1}{32}$, and ditto preference at 5$\frac{1}{16}$ to 5$\frac{3}{8}$—a fall of $\frac{1}{16}$. South African advanced $\frac{1}{2}$.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
1,551,868	Stk.	Apl. 12	5	Alliance & Dublin Ord.	78—83	..	6 0 6
374,000	Stk.	July 12	4	Do. 4 p.c. Deb.	89—91	..	4 7 11
250,000	5	Apl. 12	7½	Bombay, Ltd.	6¼—6⅜	..	5 11 1
50,000	10	Aug. 29	15	Bourne- mouth Gas & Water	10 p.c. B 7 p.c. Pref. 6 p.c.	..	5 3 5
332,000	10	"	7		15⅝—16½	..	4 6 2
75,000	10	"	6		14—14½	..	4 2 9
880,000	Stk.	Aug. 14	13½	Brentford Consolidated	255—260	..	5 3 10
390,000	"	"	10½	Do. New	195—200	..	5 5 0
50,000	"	"	5	Do. 5 p.c. Pref.	116—118	..	4 4 9
306,250	"	June 14	4	Do. 4 p.c. Deb.	95—97	..	4 2 6
218,230	Stk.	Aug. 29	11	Brighton & Hove Orig.	210—215	..	5 2 4
244,300	"	"	8	Do. A Ord. Stk.	152—155	..	5 3 3
530,000	20	Mar. 28	12½	British	44½—45½	..	5 9 11
120,000	Stk.	June 28	4	Do. 4 p.c. Deb. Stk.	91—93	..	4 6 0
250,000	Stk.	June 28	4	Buenos Ayres 4 p.c. Deb.	93—95	..	4 4 3
100,000	10	—	—	Cape Town & Dis., Ltd.	2—3	..	—
100,000	10	—	—	Do. 4½ p.c. Pref.	3½—4½	..	—
100,000	Stk.	June 28	4½	Do. 4½ p.c. Deb. Stk.	74—78	..	5 15 5
157,150	Stk.	Aug. 29	5	Chester 5 p.c. Ord.	107½—109½	..	4 11 4
1,513,280	Stk.	Aug. 29	5/9/4	Commercial 4 p.c. Stk.	106—108	+1	5 1 2
560,000	"	"	5½	Do. 3½ p.c. do.	100—102	..	5 4 5
475,000	"	June 14	3	Do. 3 p.c. Deb. Stk.	73—75	..	4 0 0
800,000	Stk.	May 31	4	Continental Union, Ltd.	83—86	..	4 13 0
200,000	"	"	7	Do. 7 p.c. Pref.	133—135	..	5 3 8
492,270	Stk.	—	5½	Derby Con. Stk.	122—124	..	4 8 9
55,000	"	—	4	Do. Deb. Stk.	103—105	..	3 16 2
1,002,180	10	July 26	10	European, Ltd.	19—20	..	5 0 0
16,160,600	Stk.	Aug. 14	4/17/4	Gas-light and Coke	4 p.c. Ord. 3½ p.c. max. 4 p.c. Con. Pref. 3 p.c. Con. Deb.	105—107	.. 4 11 0
2,600,000	"	"	3½			81—84	.. 4 3 4
4,062,235	"	"	4			98—100	.. 4 0 0
4,531,705	"	June 14	3			75—77	.. 3 17 11
258,740	Stk.	Sept. 13	5	Hastings & St. L. 3½ p.c.		91—93*	.. 5 7 6
82,500	"	"	6½	Do. do. 5 p.c.		—	.. —
70,000	10	Apl. 26	11	Hongkong & China, Ltd.		16½—17	.. 6 9 5
131,000	Stk.	Sept. 13	7½	Ilford A and C		154—157*	.. 4 17 1
65,780	"	"	6½	Do. B		121—123*	.. 4 19 7
65,500	"	June 28	4	Do. 4 p.c. Deb.		91—93	.. 4 6 0
4,940,050	Stk.	May 15	9	Imperial Continental		180—185	+2 4 17 3
1,235,000	Stk.	Aug. 14	3½	Do. 3½ p.c. Deb. Red.		86—88	.. 3 19 7
200,242	Stk.	Aug. 29	6	Lea Bridge Ord. 5 p.c.		122—125	.. 4 16 0
561,000	Stk.	Aug. 29	10	Liverpool United A		211—213	.. 4 13 11
718,100	"	"	7	Do. B		152½—154½	.. 4 10 7
306,083	"	June 28	4	Do. Deb. Stk.		100—102	.. 3 18 5
63,480	Stk.	June 28	3	Maidstone 3 p.c. Deb.		66—68	.. 4 8 3
75,000	5	June 14	6	Malta & Mediterranean		4⅜—4⅝	.. 6 3 1
560,000	100	Apl. 1	5	Met. of Melbourne	5 p.c. Deb. 4½ p.c. Deb.	—	.. —
250,000	100	"	4½			101—103	.. 4 7 5
541,920	20	May 31	3½	Monte Video, Ltd.		11—11½	.. 6 1 9
1,775,892	Stk.	July 26	4⅜	Newc'tle&G'tesh'd Con.		98½—99	.. 4 8 5
529,705	Stk.	June 28	3½	Do. 3½ p.c. Deb.		84⅜—85¼	.. 4 2 1
55,940	10	Aug. 29	7/7/0	North Middlesex 7 p.c.		13½—14½	.. 5 1 4
300,000	Stk.	May 15	8	Oriental, Ltd.		134—136	.. 5 17 8
60,000	5	Mar. 14	10†	Ottoman, Ltd.		2¼—3⅜	.. 5 14 3
60,000	50	Aug. 14	13	Portsea Island B		127—130	.. 5 0 0
100,000	50	"	12	Do. C		124—127	.. 4 14 6
398,490	5	May 15	8	Primitiva Ord.		7⅛—7⅜	.. 5 8 6
796,980	5	June 28	5	Do. 5 p.c. Pref.		5 3/16—5 7/16	−1/16 4 11 11
488,900	100	June 1	4	Do. 4 p.c. Deb.		96—98	.. 4 1 8
312,650	Stk.	June 28	4	River Plate 4 p.c. Deb.		93—95	.. 4 4 3
275,000	5	Apl. 12	12	San Paulo, Ltd.		13⅜—14½	.. 4 2 9
150,000	10	"	6	Do. 6 p.c. Pref.		11⅜—12¼	.. 4 18 0
125,000	50	July 1	5	Do. 5 p.c. Deb.		49—51	.. 4 18 0
135,000	Stk.	Aug. 29	10	Sheffield A		229—231	.. 4 6 7
209,984	"	"	10	Do. B		229—231	+½ 4 6 7
523,500	"	"	10	Do. C		229—231	+1 4 6 7
90,000	10	May 31	7½	South African		8⅛—9⅛	+½ 7 17 11
6,429,895	Stk.	Aug. 29	5/9/4	South Met., 4 p.c. Ord.		116—118	.. 4 12 8
1,895,445	"	July 12	3	Do. 3 p.c. Deb.		76—79	.. 3 15 11
209,820	Stk.	Aug. 14	8½	South Shields Con. Stk.		155—157	.. 5 8 3
605,000	Stk.	Aug. 14	5/16/8	S'th Suburb'n Ord. 5 p.c.		119—121	.. 4 16 3
60,000	"	"	5	Do. 5 p.c. Pref.		116—118	.. 4 4 9
117,058	"	July 12	5	Do. 5 p.c. Deb. Stk.		120—122	.. 4 2 0
502,310	Stk.	May 15	5	Southampton Ord.		105—107	.. 4 13 6
120,000	Stk.	Aug. 14	7½	Tottenham A 5 p.c. and B 3½ p.c.		142—145	.. 5 0 0
483,940	"	"	5½			114—116	.. 4 19 2
149,470	"	June 28	4	Edmonton 4 p.c. Deb.		94—96	.. 4 3 4
182,380	10	June 15	5	Tuscan, Ltd.		8½—8⅝	.. 5 15 11
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.		97—99	.. 5 1 0
236,476	Stk.	Aug. 14	5	Tynemouth, 5 p.c. max.		112—114	.. 4 7 9
255,636	Stk.	Aug. 29	6⅞	Wands-worth B 3½ p.c. 3 p.c. Deb. Stk.		133—141	.. 4 17 6
85,766	"	June 28	3			70—72	.. 4 3 4

Prices Marked * are "Ex. Div." † Next dividend will be at this rate.

A failure of the electricity supply, lasting about a quarter of an hour, was experienced at Coventry on Monday, the 9th inst.—the same night that Islington was deprived of the fickle illuminant.

The Directors of the Gas and Commercial Securities Corporation, Limited, have resolved to recommend a final dividend at the rate of 6 per cent. per annum, free of income-tax; making 5½ per cent. for the year to Aug. 31.

The Directors of the Antwerp Water-Works Company have declared an interim dividend of 12 per cent. per annum, tax free, for the past half year. A year ago the dividend was at the rate of 11 per cent. per annum.

The Rochdale Corporation Gas Committee have sanctioned a final payment of £1600 on account of the new installation of vertical retorts; and the Manager (Mr. T. Banbury Ball) reported that, though the contract for these amounted to £18,085, there was not a shilling of "extras."

The Romford Gas Company are extending their mains to the village of Harold Wood, and also to the Gidea Park Garden Suburb, which is increasing in popularity. The work is being carried out by Messrs. A. H. Ball and Co., Limited, of Farnham.

There is to hand from the Norden's and General Incandescent Company, Limited, of No. 45, Farringdon Street, E.C., a copy of their new season's catalogue, which contains illustrated particulars of, among other things, the "Nordeco" and "G.I.C." upright and inverted mantles, and the "Degea" and "G.I.C." burners and lamps.

There was an electric light failure in the East Ward at Scarborough last Thursday night, and those who had placed sole reliance on this form of illumination suffered consequent inconvenience. The Opera House, the Arcadia, and the Palladium had to requisition candles until the current again became available. Fortunately, gas was at hand in at any rate some portions of the hospital. The Theatre Royal also had a gas supply.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

MANAGER. Skegness Gas Company. Applications by Sept. 30.
CLERK OF WORKS. Huddersfield Gas Department. Applications by Oct. 3.
CHIEF ASSISTANT (DISTRIBUTION). No. 5632.
DRAUGHTSMEN. No. 5631.

Appointments, &c., Wanted.

GAS-WORKS FOREMAN. No. 5628.
LEADBURNER, &c. Masonic, 118, Galloway Road, Shepherd's Bush.
POSITION BY SWISS GAS ENGINEER. Z.K. 12160 care of Rudolf Mosse, Zurich.

Plant, &c. (Second-Hand), for Sale.

AERIAL ROPEWAYS, STEAM AND PETROL ENGINES. Mottram, Sheffield.
HIGH PRESSURE GAS COMPRESSOR AND FITTINGS. Boots, Cash Chemists, Nottingham.
LAMP COLUMNS AND LANTERNS. Barnsley Gas Company.
SCRUBBER-WASHER, &c. Redditch Gas-Works.

Plant, &c. (Second-Hand), Wanted.

SULPHATE OF AMMONIA STILL. No. 5633.

Meeting.

GAS AND COMMERCIAL SECURITIES CORPORATION. 39, Lombard Street. Sept. 25. Three o'clock.

Stocks and Shares.

BEXHILL WATER AND GAS COMPANY. Tenders by Oct. 16.
BRIXHAM GAS COMPANY. By Auction. Town Hall, Brixham. Oct. 5.
BROADSTAIRS GAS COMPANY. By Auction. London Mart. Oct. 8.
CLEETHORPES GAS COMPANY. By Auction. Yarborough Hotel, Grimsby. Oct. 4.
DUNSTABLE GAS AND WATER COMPANY. By Auction. London Mart. Oct. 8.
SOUTHEND WATER COMPANY. By Auction. London Mart. Oct. 8.
TENDRING HUNDRED WATER COMPANY. By Auction. London Mart. Oct. 8.

TENDERS FOR

Borehole Sinking and Pumping Plant, &c.

BARNOLDSWICK GAS AND WATER DEPARTMENT. Tenders by Sept. 23.

Coke.

WANDSWORTH AND PUTNEY GAS COMPANY. Tenders by Sept. 30.

General Stores (Lead Pipe and Block Tin).

RHONDDA URBAN DISTRICT COUNCIL. Tenders by Oct. 3.

Oxide of Iron.

SALFORD GAS DEPARTMENT.

Tar.

RHONDDA URBAN DISTRICT COUNCIL. Tenders by Oct. 3.

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